MINING WORLD

in this issue

OPERATION DEEP FREEZE

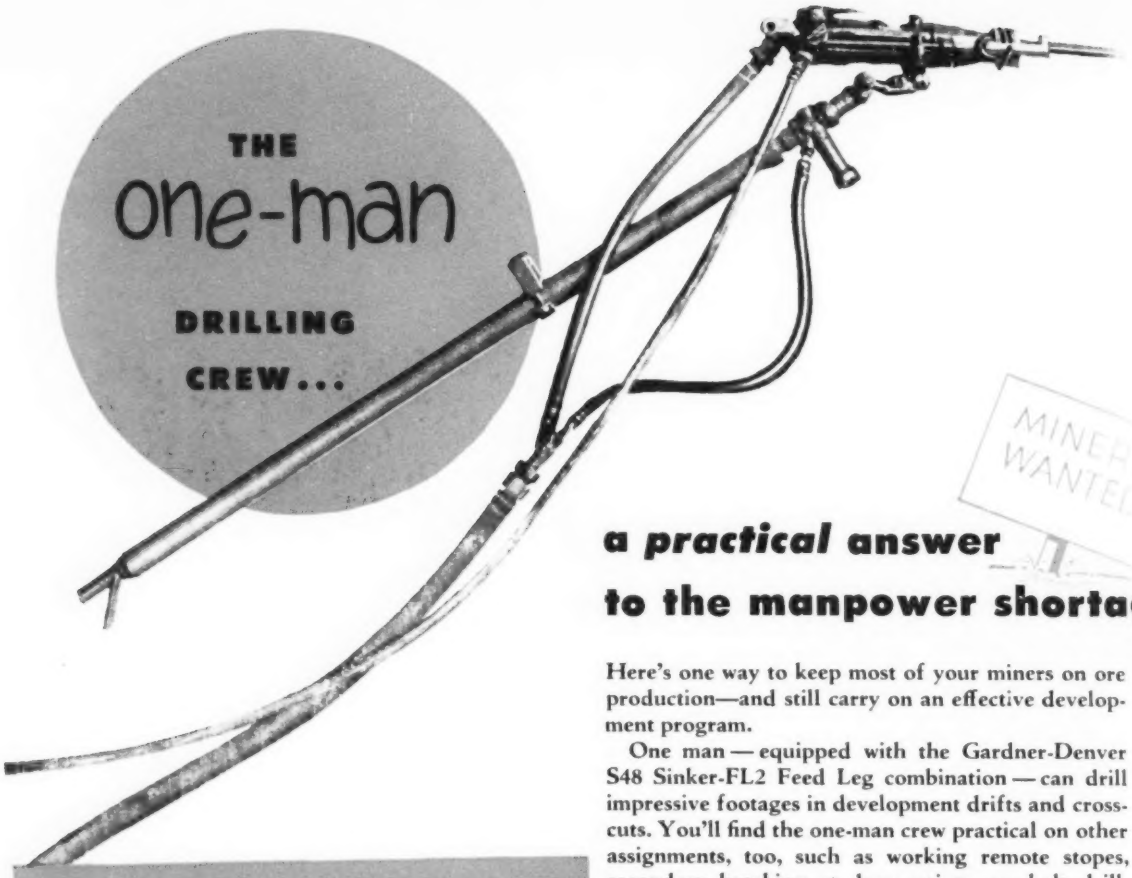
Page 34

APRIL, 1951

Vol. 13 No. 4

35 cents a copy
In Sterling, 3s.

THE
one-man
DRILLING
CREW...



a *practical* answer to the manpower shortage

Here's one way to keep most of your miners on ore production—and still carry on an effective development program.

One man — equipped with the Gardner-Denver S48 Sinker-FL2 Feed Leg combination — can drill impressive footages in development drifts and crosscuts. You'll find the one-man crew practical on other assignments, too, such as working remote stopes, secondary breaking at draw points, eye-bolt drilling, etc.

This lightweight Gardner-Denver combination is specially designed for fast drilling with tungsten-carbide tipped rods and detachable bits. It consists of the new 45-pound S48 Sinker—the equal of most 55-pound drills in speed and power—mounted on the lightweight, long-travel FL2 Air Feed Leg.

Write us today for complete information.

for more footage per man-hour
...always choose
GARDNER-DENVER SINKERS

Heavy-duty shaft-sinking models also available.

℞ **from the drill doctor**

Drills lubricated by the L012 Automatic Line Oiler *can't* run dry—never show symptoms of inadequate lubrication.

SINCE 1859

GARDNER-DENVER

Export Division: 233 Broadway, New York 7, N.Y., U.S.A.
Gardner-Denver Company, Quincy, Illinois, U.S.A.

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

DART TRUCKS CUT ORE COST

Dart Tandem Axle . . . 30 Ton Capacity

Dart Single Axle . . . 25 Ton Capacity

BOX GIRDER TYPE FRAMES ADD TORSIONAL STRENGTH AND LOAD CARRYING CAPACITY

Day in and day out, Dart Trucks deliver record breaking pay-loads in the country's biggest ore ranges; features pioneered by Dart are paying off in greater production. Dart engineered axles, for instance, front and rear, are specially designed for off-highway haulage. Also, Dart Trucks are available with torque converters and special transmissions—or conventional drive transmissions to meet varying operating conditions and grades.

"Tonnage Engineering" by Dart means that power and construction are engineered to move more tonnage....faster, and for less cost per ton.

- *Consult Dart Engineers . . .*

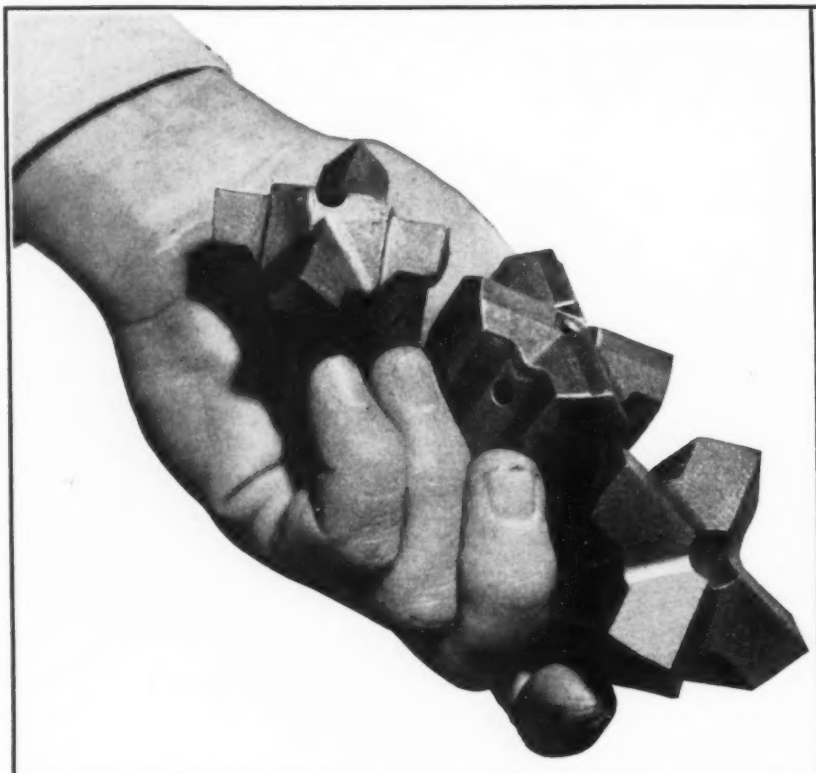
  Dart engineers build heavy duty trucks to meet specific requirements. They have helped overcome many major hauling difficulties for others and welcome the opportunity to work with you.

Dart TONNAGE ENGINEERED Trucks

DART TRUCK CO. KANSAS CITY 8, MISSOURI

OVER 40 YEARS EXPERIENCE IN BUILDING SPECIALLY ENGINEERED TRUCKS

Only the TIMKEN Company offers all 3 rock bit types...



READING LEFT TO RIGHT IN PHOTO:

1 ONE-USE "SPIRALOCK" For use where reconditioning is impractical or undesirable. Offers lowest unit bit cost. New "Spiralock" union holds bit dependably—permits easy removal. Simplifies drill steel preparation. More bit applications per drill steel.

2 CARBIDE INSERT For extremely hard and abrasive ground, small holes, extra deep holes. Gives you more drilling time — less time changing bits. Holes go down faster. Reconditioning is simplified. Offers many advantages which compensate for higher unit cost.

3 MULTI-USE Basic removable rock bit for 18 years. Gives lowest cost per foot of hole when full increments of drill steel can be drilled and when control and reconditioning of bits are correct. Low cost! Requires less policing than carbide insert bits.

and a complete Rock Bit Engineering Service!

Which bit is the best bet for *your* job? The Timken Company's Rock Bit Engineering Service can help you find the answer. Since only the Timken Company makes multi-use, carbide insert, and one-use "Spiralock" bits, our engineers alone can give you an unbiased recommendation of the best bit for your specific needs. And our engineers have been solving rock bit problems for 18 years.

So, whether you're looking for lower bit cost, lowest cost per foot of hole drilled, greatest possible drilling speed, or any other advantage, chances are our rock bit engineers can help you get it. For information and help, contact The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

FREE BOOKLET: *Everyone who buys rock bits should have a copy. Gives full information on all three types of Timken rock bits and our Rock Bit Engineering Service. Shows full line of bits with detailed descriptions, plus other useful rock bit information. Write for your free copy.*

TIMKEN . . . *your best bet for the best bit . . . for every job*

TRADE-MARK REG. U. S. PAT. OFF.

MINING WORLD, published monthly except in April when publication is semi-monthly, by American Trade Journals, Inc., 124 West Fourth Street, Los Angeles 13, California, U.S.A. Subscription in United States, North, Central and South America, $3.00 per year; other countries, $4.00 per year. Entered as second class matter at the post office at Los Angeles, California, under Act of March 3, 1879.

MINING WORLD
with which is combined
THE MINING JOURNAL

A Miller Freeman Publication

Published monthly except in April when publication is semi-monthly

APRIL, 1951

VOL. 13 No. 4

SAMPLE LOCATIONS

PUBLISHING OFFICE
Los Angeles 13, Calif. ..... 124 W. Fourth St.

EDITORIAL AND BUSINESS OFFICES
San Francisco 5, Calif. 121 Second Street
GArfield 1-5887

Branch Offices
Seattle 4, Wash. ..... 71 Columbia St., MAin 1626
Vancouver, B. C. ..... Royal Bank Bldg., MArine 1520
New York 17 ..... 370 Lexington Ave., Murray-Hill 3-9295
Chicago ..... 4556 N. Paulina, LOngbeach 1-2796

GENERAL MANAGER, San Francisco ..... M. F. HOLSINGER
EDITOR ..... GEORGE O. ARGALL, JR.
PRODUCTION MANAGER ..... J. M. STALUN
EASTERN MANAGER, Chicago ..... KAREL WEGKAMP
FIELD EDITOR ..... HOWARD WALDRON
NEWS BUREAU ..... V. P. COLLINS
ASSOCIATE EDITOR, Vancouver ..... CHARLES L. SHAW

Published by
AMERICAN TRADE JOURNALS, INC.
MILLER FREEMAN, President
L. K. SMITH, Vice-President
W. B. FREEMAN, Publisher

SUBSCRIPTION RATES

U.S., North, South and Central American Countries $3.00
Other Countries $4.00
Single Copies $0.35
Directory Number $2.00

DRIFTS AND CROSSCUTS

Men, Machines, Methods, and PEP

Men, machines, and methods—three "M"s—are the factors in the growth and increasing efficiency of the mineral industry. Which is most important? Undoubtedly the men! For they are responsible not only for their own existence, but also for that of the machines and methods.

Concerning the relative importance of machines and methods, it has been clear from the beginning of time, and it has become increasingly clear during the past 15 years of increased mechanization, that the best method is the one which makes the best use of the best available equipment. So available equipment is usually the factor which determines the best method of mining, milling, and smelting.

Increasingly aware of their responsibility for the progress of industry, and as an important part of their never-ending job of generating interest in their products, manufacturers are pleased to give you the best information they have concerning the products they manufacture and the best method of using those products. The information that manufacturers can supply is tops: It is backed up by research, product development and design, product testing, and observation of equipment in use on the job. The men who contribute to manufacturer's know-how are specialists—research scientists, production experts, engineering salesmen.

Your first means of acquaintance with new equipment will usually be the reading of advertisements and news items in the mining publications.

It is not the role of every man to use newly available equipment and processes to, like D. C. Jackling, envision and create a Bingham Canyon copper pit and flotation mill, or, like W. C. Browning, to create a Round Mountain gold operation. But it is the role of all mining men to study the newly available equipment and, by putting it to the best possible use, to process their ores by the best possible method.

Advertisements of mining equipment are studied carefully by most of you. As a further step in your study of equipment you may use, we urge you to take advantage of information published by manufacturers and described in the Production Equipment Preview (PEP) section of this magazine. Each item of free literature and each new product is keyed by a number which corresponds to the number on the new (with this April issue) Prepaid Enquiry Postcard. Whenever you feel that a new product or item of information may be useful in your mine, mill, or smelter, we urge you to fill out the postcard completely, circle the numbers of literature items you wish to receive, and drop the PEP card in a mailbox. MINING WORLD will act as a clearinghouse to get the desired information from the manufacturer to you in the shortest possible time with a minimum of effort on your part.

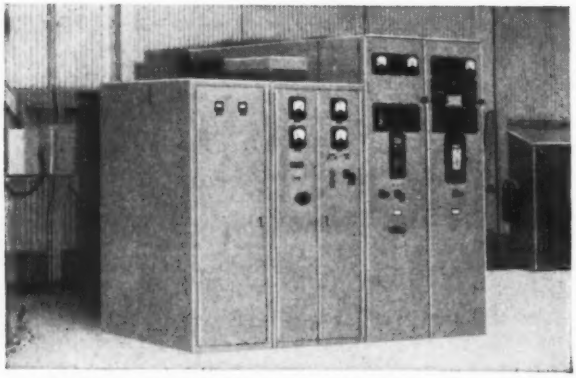
It is our belief that, through study of advertisements and free manufacturer's literature, you will be able, dollarwise and safetywise, to improve your operation. Make good use of the new PEP card. H. L. W.

Development of the Last Frontier

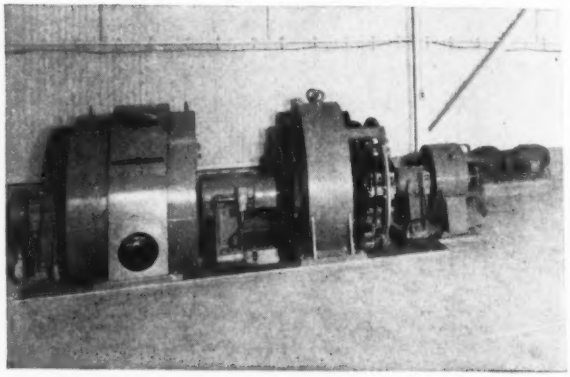
The Navajo Indian Reservation, which is located in Arizona, Utah and New Mexico, has been termed the "last frontier for uranium." Rightfully so when it is con-

Continued on Page 6

AUTOMATIC HOISTING for continuous tonnage!



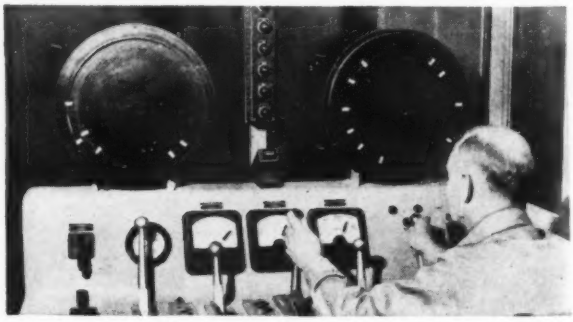
Completely metal-enclosed for personnel safety, this control cubicle houses the synchronous motor switchgear panel, plus Ward Leonard type d-c control equipment. Less space requirement and simplified control result from use of the G-E amplidyne, which eliminates need for many contactors and relays, while permitting the retention of safe limits on the hoist's acceleration and deceleration.



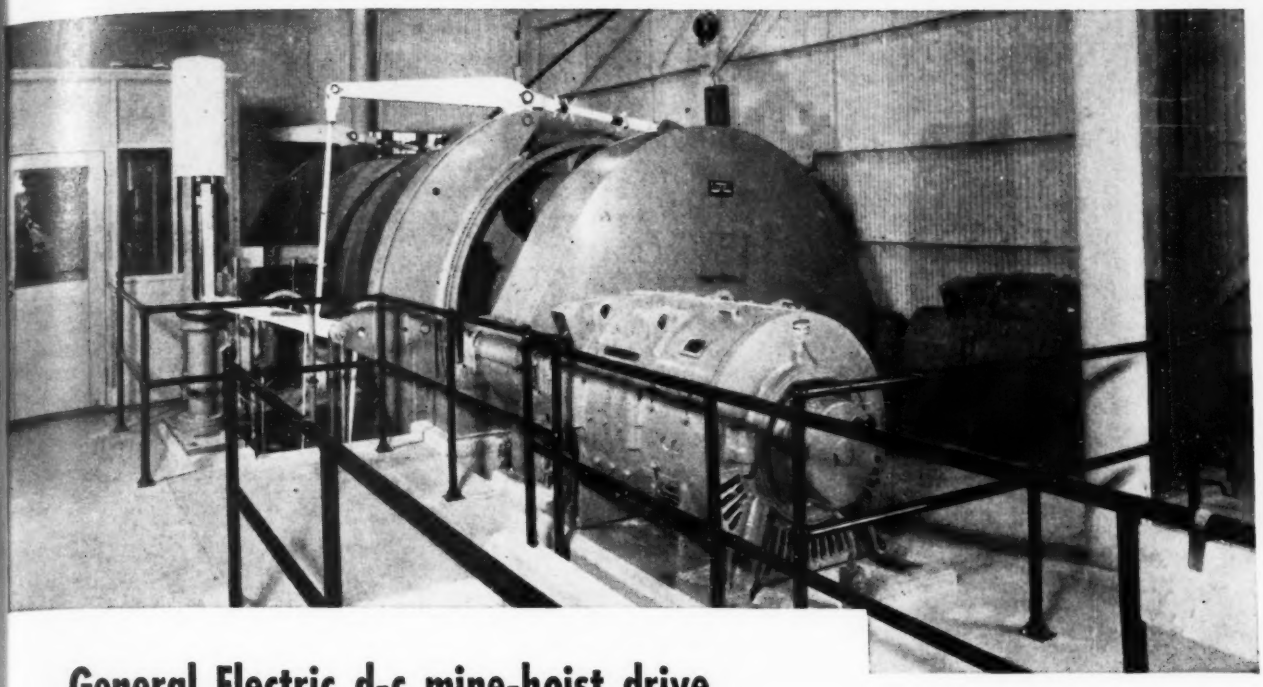
Converting a-c to d-c, this G-E motor-generator set comprises a 750-kw generator, an 1100-hp synchronous motor, and a 20-kw exciter. The generator supplies adjustable-voltage power for the operation of the two hoist motors. At right, the G-E amplidyne, used as an exciter for this generator, provides superior operation and more positive limits of acceleration and deceleration, for greater safety, increased production.

MINE-HOIST DRIVES

—to cut mining costs!



When necessary for inspection, testing, or man-trips, control of the hoist can quickly be switched from automatic to the manually operated master controller as above. Adequate starting, stopping, and maneuvering of the skips with ease, precision, and safety is provided by the optional manual operation. With the normal automatic operation, the duties of the operator may be chiefly of another nature.



This automatic mine hoist is powered by a complete G-E drive that includes two 500-hp d-c motors. When the skip at the shaft bottom is fully loaded, it starts and accelerates to full speed. Near the dumping pocket, it automatically slows down, eases through the dumping horns, and makes a dead stop at the final limit of travel, thus completing the entire cycle automatically.

General Electric d-c mine-hoist drive with amplidyne control permits continuous output at 8 tons per minute, simplifies operation, increases safety, prolongs equipment life!

Here is another General Electric amplidyne-controlled d-c mine hoist drive helping to boost output and cut costs—in this case in a New Mexico potash mine.

This high-speed high-tonnage hoist raises in balance an 8-ton payload every minute up an 1150-foot shaft at speeds up to 1500 fpm. The hoist runs fully automatically throughout the entire shift, and may also be run by push-button control operated by the skip loader at the loading level.

Because it is completely automatic, this continuous, highly efficient operation permits hoisting maximum tonnage per man-hour. Hoist speed is closely maintained in spite of load variations, repetitive operation helps cut costs per ton, and personnel may be freed for other duties. Electric braking provides greater safety and prolongs the life of the hoist mechanism.

Applicable for any type of mining, this installation is further evidence of G-E experience in engineering automatic mine-hoist drives, experience that dates back to 1915. Let a G-E mining specialist put this experience to work on *your* mine-hoist problems. Call him at your nearest G-E office. Meanwhile, send for Bulletin GET-1430. *Apparatus Dept., General Electric Company, Schenectady 5, N.Y.*

GENERAL ELECTRIC

660-22

DRIFTS AND CROSSCUTS

Continued from Page 3

sidered how remote and difficult of access are many parts of it. Visionary prospecting and aggressive exploration has developed important ore reserves in the Lukachukai Mountains within the last year. Today prospectors are bringing in samples of high grade ore which they say come from the difficult-to-reach area surrounding Navajo Mountain, just north of the Arizona-Utah state line.

At a recent conference held at Window Rock, Arizona, by the Navajo Tribal Council, by representatives of the U. S. Atomic Energy Commission, the U. S. Geological Survey, and large and small uranium-vanadium producers, various plans were proposed to expedite and facilitate prospecting for and development of the Reservation's mineral deposits.

Of particular significance was one proposal advanced by Cato Sells, Navajo Reservation miner. Key points of his proposal were:

"1. An office should be set up, either as a part of the land branch, or separately, to be headed by a superintendent of mining. The man who heads this department should be some one trained and experienced in mining.

"2. The office should be financed, and the service it performs paid for, by the payment of a royalty of probably one percent over and above the royalty paid to the tribe. Filing fees should also be charged in connection with permit or lease applications to help bear the expense.

"3. Mining permits should be convertible into leases, and both should be assignable. Overriding royalties should be permitted when permits or leases are assigned. Persons or firms to which permits or leases are assigned should be qualified in the mining field by experience, and should be financially responsible. No reassignment should be allowed in order to stop all speculation in permits or leases.

"4. Any person who is issued a mining permit should first be required to show that he is qualified by experience and financially able to develop the permit, or that he will have associated with him some person or firm so qualified.

"5. Mining permits should be made up of units of 50 acres and each permittee should be allowed to hold up to a maximum of 40 units, or 2,000 acres. There should be done $250.00 per year of work for each unit in the way of drilling, mining, road building, etc. Adjoining areas of permits could be developed as one unit. In case the yearly work or expenditures are not done the mining permit should be forfeited.

"6. Mining leases should require either the payment of $250.00-per-unit per year to the tribe, or satisfactory evidence that that amount has been expended in mining, development, road building or other beneficial work. Failure to do one or the other should forfeit the lease.

"7. Mining permits should be issued for a two-year period, and renewable for one two-year period."

COMING CONVENTIONS

April 27, 28, 1951. NORTHWEST INDUSTRIAL MINERALS CONFERENCE, Congress Hotel, Portland, Oregon.

April 30 through May 4, 1951. NATIONAL MATERIALS HANDLING EXPOSITION, International Amphitheatre, Chicago, Illinois.

May 21 and 22, 1951. AMERICAN ZINC INSTITUTE, Statler Hotel, St. Louis, Missouri.

FOREIGN METAL PRICES ARE HIGHER THAN THOSE U. S. MINES RECEIVE

While DMA does nothing to improve the immediate copper situation, preferring to look to the future development of large orebodies to bring in supplies a few years hence, NPA slaps tighter and tighter restrictions on the consumer. Defense Minerals will not approve over-market copper contracts, which would quickly bring in some copper from marginal operators, claiming that the copper supply is not as tight as people think. At the same time that United States producers struggle under the 24.5 cent price ceilings, foreigners are said to be bidding as high as 50 cents per pound for the red metal.

In addition, the government is having a hard time making contracts for foreign zinc at the ceiling price of 17.5 cents per pound. The reason is obvious. Some zinc is being sold abroad at as high as 27 cents per pound. Why should foreign producers ship to the United States?

● Krug's Program Is Followed

In March of 1948, former Secretary of the Interior Krug set the pattern which is being followed by Defense Minerals Administration. He told a group of congressmen that the Interior Department "thinks it knows which mines should get contracts to produce the right minerals at the right prices." He also said that such contracts should contain sufficient incentives to get what materials are required for stockpiling and in that respect he appears to have been over optimistic.

Krug also remarked, with regard to exploration, that he did not believe in grants and considered matching funds absolutely necessary. He stated that he did not want the task of determining who should get exploration money and how much, but that the amount of money a company could afford to spend would sort them out automatically as substantial operators.

At the same conference Krug said that through the contract system he could "encourage meritorious properties but not the hopeless cases," and that such contracts "can be made rapidly and protect the government from exploitation." He also commented that the operation of the premium price plan was a "hopeless administrative task."

It looks as though Krug got out just in time! No administration could have been simpler than that of the premium price plan. It is DMA that seems to be faced with the hopeless administrative task.

● RFC Mine Loans Needed

It is being rumored around Washington that the RFC mine-loan division will be abolished or merged with the general business-loan section—which would amount to practically the same thing. As a matter of fact, since the 80th Congress stripped the RFC of its specific mine-loan authority in June of 1948, few mine loans have been made. Now, however, it is presumed that DMA will authorize some loans and the division should be kept intact to service them. The gradual tendency unfortunately is toward tight, central control of the mining industry by the Bureau of Mines.

● Truth Would Simplify Problem

The Defense Minerals Administration could clear its desks of perhaps 75 per cent of the mining aid applications by the simple device of telling the truth about the exploration, over-market purchase and loan programs. It should announce flatly that there is no use applying for exploration money unless the applicant has dollar-for-dollar to put up with the government. This would stop over 90 percent of the new applications. DMA should inquire of the applicants who already have asked for assistance if they are prepared to put up 50 percent of the money, and return the dockets to those who are not. This would clear up perhaps 75 per cent of the balance.

As to the applications for expansion and plant loans, DMA should announce the list of metals and minerals for which it is prepared to pay overmarket prices. Those applicants who require over-market prices to produce, and who have asked for loans, should be informed concerning their category. If not eligible for over-market production contracts their applications should be denied promptly and returned. New applicants should be told not to file. This would clear out most of the remaining applications.

The few who can match dollars on exploration, or who can pay off an expansion loan at market prices, could be processed by Administrator Boyd, personally, from the data submitted.

● Benefits Will Be Limited

The new "matching funds" exploration program announced by Secretary of the Interior Chapman, to be carried out generally on a 50-50 basis between the operator and the government, brought a pertinent comment from Carl Trauerman of the Mining Association of Montana. He remarked that if the miners had that kind of money they would be using it to mine with. Trauerman's reaction is that of a man who knows his miners.

It is interesting to note that the government proposes to get its share back by insisting on a royalty from net mill, smelter or other proceeds from such project. There is no mention of repayment just from the proceeds of the specific ores discovered during the exploration the government is helping to pay for. The provision raises an interesting field of speculation. Further, the 50-50 deal can be varied even, perhaps, to the point of underwriting an entire pet project, should DMA feel so inclined. The benefits of this program will accrue to a very limited number of people.

● "Peril-Point" Clause Inserted

The House has amended the Reciprocal Trade Agreements Act by inserting, among other things, the so-called "peril-point" language. This amendment would force the President to let Congress know before cutting tariffs on any item if the Tariff Commission has made a determination that such a cut would injure domestic industry.

If the Senate retains this feature, it will be a great victory for the protectionist groups in Congress. Last time Senator Millikin of Colorado lead the fight in the Senate for such language and lost by a small margin.

Under the new bill the Tariff Commission would be authorized to grant relief to the damaged industries by restoring all or part of any cuts that may have been made.

In a view looking northerly from the main haulage road, this photograph of the Colorado pit gives an idea of the few machines and men in a modern truck pit. Left, a Dart truck heads for the crushing plant, as a P&H 1400 electric shovel digs into the 3650-level bank. Right, a P&H 855B diesel shovel stands by while a Bucyrus-Erie 29T churn drill on the 3700-level bench drills a bank-top hole down to 3644.

PIT THE TOP--CAVE THE BOTTOM

Inspiration Consolidated, a block-caving veteran, now uses two openpits to mine upper levels of orebodies still mined in depth by block caving

At Inspiration, Arizona, what started as a temporary operation to clean up cone and wedge-shaped remnants left by block caving has now grown into a full-fledged truck pit. Continuing its underground operation at the same time, Inspiration Consolidated Copper Company is now operating two separate truck pits—the Colorado and the Live Oak—which produce 6,000 tons of one-percent copper ore daily.

From the pits, trucks carry ore three-quarters of a mile to a primary crusher plant that is almost fully automatic and virtually dust free. Crushed ore is conveyed to a 5,000-ton storage system, drawn to railroad cars, and hauled to the main crushing plant for blending with underground ores to be processed by ferric sulphate leaching.

P. D. I. Honeyman, vice-president and general manager of Inspiration, says, "Open-pit mining was considered by management more than 30 years ago, but the equipment we needed to operate such a pit was not developed until after World War II."

Pit Proves Profitable

In 1946 and 1947 when early plans for the pit were forming, the key pieces of equipment that Inspiration looked for were a heavy-duty, off-the-road truck, and a power plant that would enable economical haulage over steep grades. The Dart truck, mounting a 16-yard Heil box, provided the answer to the search for a truck. A new Hercules automotive Diesel, the DFXH, provided a power supply that would enable the Darts to carry a 24-ton payload up seven-percent grades at a speed of six to eight miles per hour.

UG Data Used in Pit Planning

The two pits are separated by the Bulldog fault, which lies roughly along the course of the main-haulage road. The ore now being mined from the pits is not newly discovered ore but is rather a surface extension of known orebodies.

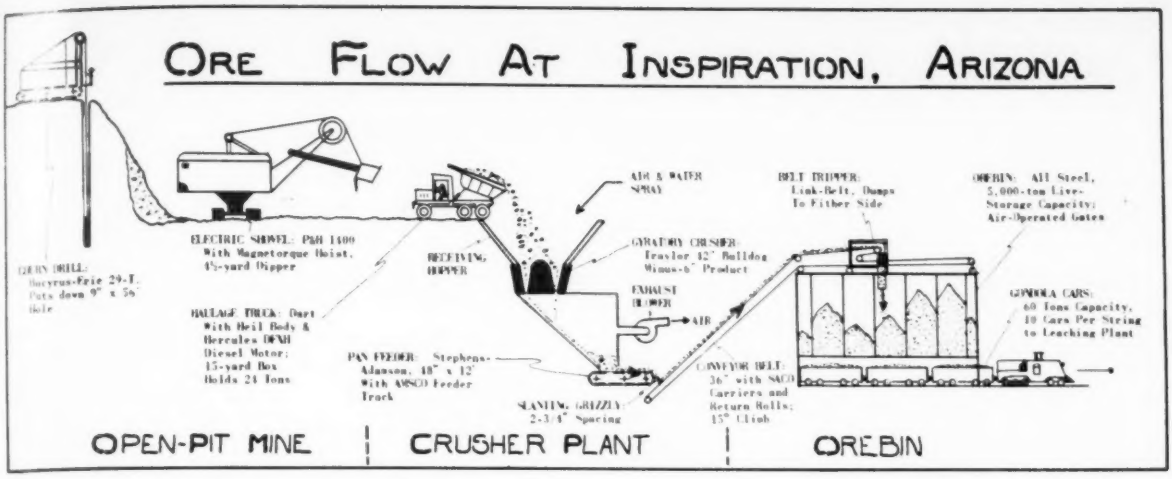
During the earliest stage of planning for pit mining, assay maps from surface drill holes were correlated with underground mining and geological data. From the known picture of the orebodies, Inspiration engineers developed final pit plans.

Benches are established at 50-foot vertical intervals. Because the overall slope of the final bank is held

OPERATIONAL ADVANTAGES OF INSPIRATION'S TRUCK PITTING

Truck pitting, made possible by postwar equipment, has proved so successful that some areas which were scheduled for block caving have now been included in the pit system. Growing in importance at Inspiration, the truck pit has clearly demonstrated these operational advantages:

1. *Cost.* The cost of block caving has risen sharply with increasing timber, manpower, and supply costs. But during the same period, the cost of truck pitting has been reduced by the increasing efficiency and capacity of surface mining equipment.
2. *Selectivity.* The open pit, though not an extremely selective method of mining, is still much more selective than block caving. The Inspiration operation uses a ferric-sulphate leaching process which requires close control of both the grade of ore and the ratio of oxide ore to sulphide ore. Because ore from the Live Oak pit is mostly oxide, and ore from the Colorado pit is mostly sulphide, the two-pit operation allows for much better blending and control of ore feed to the treatment process.
3. *Manpower.* The manager of a small underground mine recently said, "The fellows who have been hurt least by the mining-manpower situation are the pit and bulk-mining operators—they employ fewer men." Pit mining at Inspiration produces more tons of ore per man shift than underground mining, thus requiring less manpower and reducing the problem of hiring enough men to sustain operations.
4. *Increased Available Ore.* By pit mining, some tonnage of caving remnants and surface ore will be recovered that could not be recovered economically by block caving.



at 45 degrees (less than the angle of excavation), each mined-out bank has a small berm area which occurs as a remnant bench.

The haulage road into each pit, built wide (30-feet minimum), slopes at a seven-percent grade from the main-haulage road to the crusher.

The big development feature of the Inspiration pits is the main-haulage road that meets the entries from the Live Oak pit on the west and the Colorado pit on the east. The road then leads northerly at a constant uphill grade of seven-percent through a deep cut on Inspiration ridge to the crusher plant.

These permanent roads are continuously sprinkled and are constantly graded with a Caterpillar Motor Grader. Well-planned, the haulage roads are now maintained so that they are among the finest pit roads in the world.

Churn-Drill Holes—Bag Powder

Location of proposed churn-drill holes is checked and plotted on a complete set of pit plans; great care is taken to avoid piercing old underground workings. In addition to being carefully spotted, holes are measured at the time of drilling and again just before loading to prevent the possibility of loading a caved hole.

Bucyrus-Erie 29-T churn drills, powered by induction motors, use a nine-inch bit and sink holes to a depth of 56 feet.

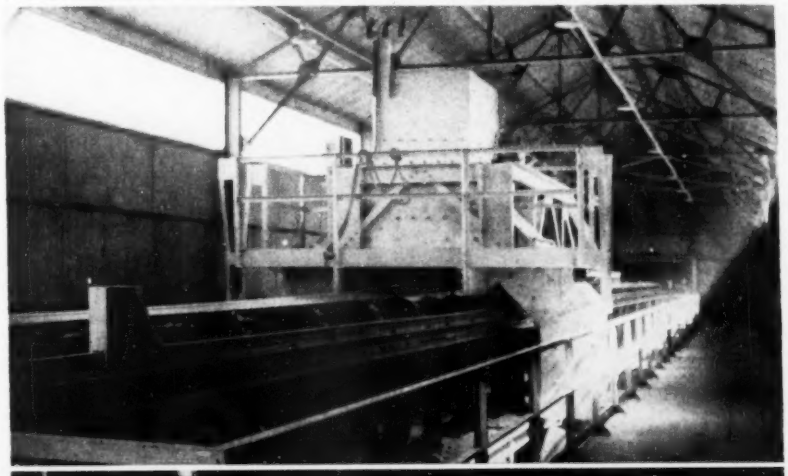
Live Oak ore is hard to break (see cut of hole loading) and so holes are spaced at close intervals, loaded with more powder of a higher strength and loaded with a 150-pound "deck" charge.

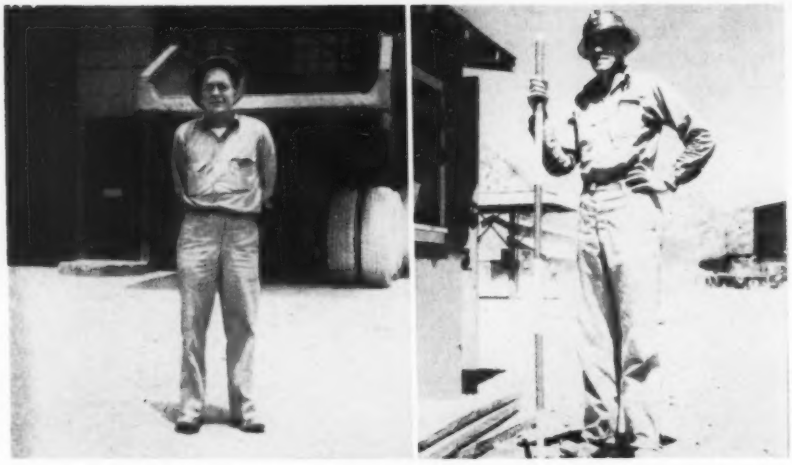
Primer powder, Apache 60-percent special gelatin, comes in 4 by 8 inch sticks. In the Live Oak pit, because the rock is angular and shattered, two Primacord leads are run from each hole. The leads are tied to a running lead of Primacord which in turn is tied to a blasting lead terminating in a single electric blasting cap.

Air-Drill Holes—Stick Powder

Frequently, where the natural terrain meets a developing bench the small hummocks or wedges of ore or waste less than 50 feet in height do not warrant churn drilling; two Ingersoll-Rand X-71 wagon

TOP: The Link-Belt traveling belt tripper can be positioned to dump ore into any of the 14 orebins of the 5,000-ton storage system. BOTTOM: Ore is metered by the totally inclosed SACO pan feeder, falls to this 36-inch conveyor belt which then carries it to the system of orebins. The conveyor system uses Stephens-Adamson Simplex carriers and return rolls. Flaps over the belt reduce the flow of air into the exhaust dust-control system at the crusher plant.





LEFT: H. R. Burch, general pit foreman, stands at the entrance of the maintenance shop. RIGHT: Chief mine engineer C. D. Huffine plumbs a one-inch piece of pipe, "barber pole," that is used for permanent triangulation stations throughout Inspiration holdings.

drills are used in these rough, inaccessible spots. Steel changes which provide up to 30 feet of drilled depth are used. The holes are drilled from the toe of the banks. Lifter holes slope downward at a 15° angle and are spaced along the bank at an average interval of six feet. Additional holes, on six-foot centers, are drilled as necessary. Wagon-drill holes are loaded with 25 to 50 pounds of 1½ by 12 inch Apache special 20-percent dynamite and are blasted with Primacord detonated by cap and fuse. Rock in the pits breaks to a small size requiring little secondary blasting.

Four Dippers Make One Load

One crawler-mounted P&H 1400 electric shovel, equipped with a Magnetorque hoist, is worked in each pit. The shovel operator loads the 16-yard box of a Dart truck in four passes with the 4-yard dipper and then operates a siren to tell the truck driver whether his load is ore or waste: One siren blast designates waste; two blasts designate ore; and three blasts tell the truck driver to back up.

A smaller shovel, a P&H 855-B equipped with a 2-yard dipper, is used for small loading jobs at various points in both pits. Being diesel-powered, the 855-B moves more quickly from one job to the next.

Loaded Dart trucks carry ore from the pit to the receiving hopper at the crusher plant. Each of the 12 Dart trucks carries a payload of 24 tons and makes a round trip in approximately nine minutes. Trucks approach the receiving hopper at the crusher plant, make a turn around, back up to the hopper, dump the load, and head for the pit in a forward direction.

Water & Air Eliminate Dust

In a big crusher plant, dust is often a major cause of equipment wear, a health hazard, and a nuisance. The Inspiration crusher plant has been described by authorities as "the cleanest crusher plant in the world." Dust is controlled by water spraying which settles the dust and by ventilation which removes the remaining dust. Arranged in a circular pattern above the gyratory crusher, manually operated water jets spray ore as it comes from trucks and enters the mouth of the crusher.

A dust-tight enclosure surrounds all ore-handling equipment in the crusher plant; built as a single continuous air course, the enclosure starts with the gyratory crusher and ends with the conveyor belt leading from the pan feeder. A centrifugal fan, exhausting air from the crusher system at the surge bin between the gyratory crusher and the pan feeder, keeps the enclosed system at less-than-atmospheric pressure, and so prevents dust from escaping into the plant.

Compressed air jets are positioned outside the enclosure near the mouth of the crusher to blow fines into the in-going air stream.

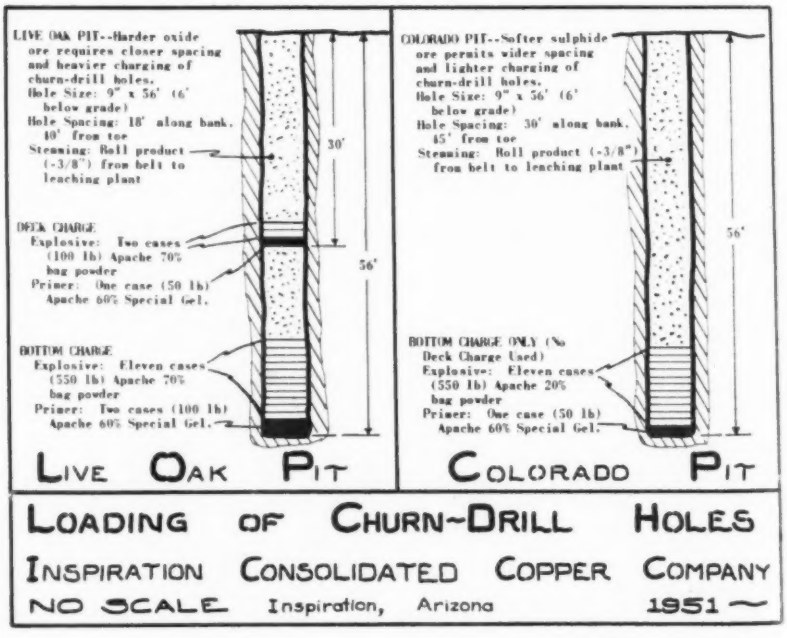
Interlocking Protects Equipment

The new crusher plant was built into the north side of Inspiration ridge so that the high-receiving elevation and the low-discharge elevation allow for gravity flow of ore through the crushing unit. The crusher building consists of five floors from which all machinery is readily accessible.

The entire system of machinery is electrically interlocked; when a failure occurs in the system, all machinery except the gyratory crusher stops. If the belt stops, the pan feeder stops. Signals on the annunciator panel give the location of trouble. As an example of the degree of interlocking, the oil feed to the gyratory crusher is interlocked by Mercoid switches which react when the oil level is too high or too low, when oil is too hot, or when oil pressure is high or low.

Fast Crusher Adjustment

Dumped from the trucks, ore falls to the 45° sloping ramp of the receiving hopper. The wearing surface of the ramp consists of inverted



railroad rails along which ore slides to the mouth of a 42-inch Traylor Bulldog gyratory crusher. The gyratory, at the time of MINING WORLD's visit, was adjusted for a median setting of 4 5/16 inches, a throw of 1¾ inches, and a maximum product size of 6 1/16 inches. Despite its size, the crusher can be adjusted to change the size of the crushed product in a matter of minutes. John J. Hyland, crusher plant foreman, says, "When we want to change the setting, we pick up the muller with the 60-ton overhead crane; that takes the weight off the suspension nut. One man removes the key, then turns the big adjusting nut by hand and re-inserts the key—the crusher is ready to produce the new size of product."

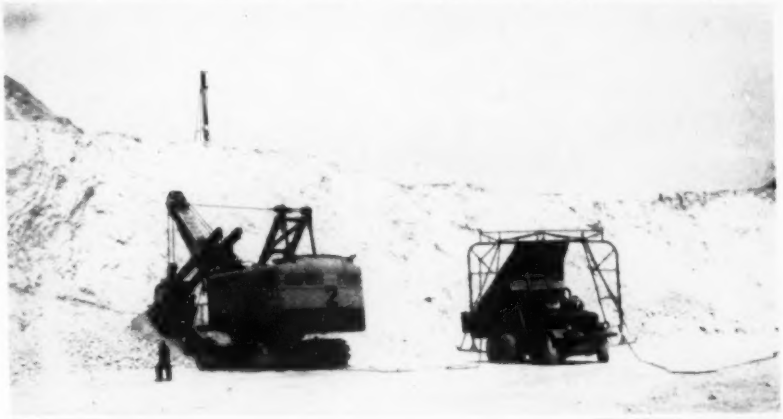
Crushed ore falls from the gyratory crusher to a surge bin, is metered by a 48-inch by 12-foot Stephens-Adamson AMSCO pan feeder, and falls through slanting steel grizzlies, spaced at 2¾ inches, onto a 36-inch conveyor belt. The slanting grizzlies are not truly a sizing device but are rather a belt-protection device: fine ore, passing through the grizzlies, covers the belt and forms a cushion onto which the plus-2¾-inch ore falls without cutting or wearing the belt.

The 36-inch conveyor belt that carries ore to the orebin is repaired and spliced by vulcanizing, a system which John Hyland says "minimizes wear in the conveyor system by a reduction in bumping on head pulleys, tail pulleys, throughing idlers and all other parts. We have run 3,500,000 tons over this belt and have not had to replace one idler or one bent pulley."

The 36-inch conveyor belt, running over Stephens-Adamson Simplex carriers and return rolls, carries ore to a Link-Belt traveling tripper which moves over the orebins with a total live capacity of 5,000 tons. The belt tripper discharges ore into any one of the bins. Ore is drawn through air-operated bin gates into 60-ton gondola cars on the railroad siding below the bins; the cars, made up in strings of 10, are pulled by locomotive to the main crusher plant.

New Machinery—New Method

By making available copper which was unavailable by block caving, by decreasing the cost of production on shallow copper ores, and by conserving manpower, the truck pit at Inspiration has shown that it is a worthwhile surface complement to deeper underground mining operations. The Colorado and Live Oak pits, which were only "considered" 30 years ago, have been made a reality by modern surface-mining and haulage machinery; and they are a reality that is now producing approximately 6,000 tons of critically needed copper ore daily.



TOP: As Operator Fred Splane moves the P&H 1400 electric shovel to a new loading zone, Jack Evans' Dart truck picks up the trail-cable arch and follows the shovel. Spotter Ray Eaton (left) walks ahead, picks out the route, and keeps his eye on the trail cable. CENTER: Powderman Alfred Vasquez detonates a string of wagon-drill holes in the Live Oak pit. Each hole is loaded with approximately one-half box of 1½ by 12 inch, 20 percent stick powder. Because this blast was near the area where the P&H 1400 shovel was working, the shovel was faced away from the blast. Setting off the blast, Vasquez spit the 3½ foot length of fuse (50 seconds per foot) to the blasting cap on the running lead of Primacord and took shelter in the 4-yard shovel dipper. BOTTOM: The power substation and orebin system are built on a benched area north of the crusher plant (right foreground). The crushing plant is approximately ¾ of a mile from the active pit areas.

NEW MEXICO MINERS HEAR REPORTS ON GEOLOGY, URANIUM AND POTASH

Uranium and relations between government and the mining industry highlighted discussion at the mid-February 1951 convention of the New Mexico Miners & Prospectors Association at Albuquerque, where registration topped 300.

T. O. Evans of Los Angeles, head of the Santa Fe Railway's mining department, said pitchblende has been found in small spots up to three millimeters in diameter in the limestone of the new Grants uranium location some 80 miles west of Albuquerque. But asked the value of the mineral (carnotite plus pitchblende) discovery, he replied that it is "much too early" to say.

The Defense Production Act was explained by J. H. East, Jr., Denver, Colorado. East is the first director of the U. S. Bureau of Mines, Region IV. He insisted that DMA is not a "'grubstake' act as publicized," although, "it is my opinion that eventually some aid to 'wildcatters' will be necessary."

He said that "the Defense Production Act was not intended to apply to all minerals nor to all mines. Its objective is to obtain strategic and critical metals and minerals needed for the defense effort rather than to act as a spur to general mining. For this reason, mines that can produce the essential metals and minerals quickly will be given preference in awarding loans and purchase contracts.

"In every case," the official asserted, "the application for government assistance will be investigated by a geologist and an engineer. This is something of a disappointment to certain promoters."

T. M. Cramer of Carlsbad was elected chief of the New Mexico Miners and Prospectors Association at the Albuquerque convention. He is vice president of the United States Potash Company.

He advised the miners and prospectors to "state your case clearly and fairly when filling out applications, but be a little inclined to be optimistic."

Selling Ore to the Government

Otto G. Klein of Denver, regional director of the General Services Administration, told the miners that "if you have ore to sell (for the stockpile), the government wants to buy it." Klein gave the following sketch of how the multi-million-dollar stockpiling machine works:

The Munitions Board determines needs, fixes specifications, and issues directives to purchase. The directives go to the Emergency Procurement Service of the GSA. This agency's purchase organization "includes metals, minerals and ores sections. Further, it has the necessary personnel to supervise transportation and storage of materials, as well as to perform the other functions involved in maintaining the stockpile."

He explained that "purchasing is done by negotiation. There is no formal advertisement of requirements. When a directive to buy is received, the EPS calls upon suppliers by telephone, letter, and wire, and also negotiates with them in person. The Service indicates the material wanted, a minimum quantity wanted, and the specifications which the material must meet . . ."

In contacting the EPS, "the producer (of a material being bought) indicates the quantity available, the price he asks, and a delivery schedule which he can maintain."

He asserted that "it is true that today the EPS represents an extremely active market and is very interested in hearing from producers, large or small, who can supply materials meeting specifications."

He repeatedly emphasized that if the miners have materials to sell for the stockpile they should write to:

Commissioner A. J. Walsh
Emergency Procurement Service
7th and D Streets, S.W.
Washington, D.C.

New Mexico mining leaders at the 1951 convention of the New Mexico Miners & Prospectors Association are, left to right, retiring president William H. Goodrich, general manager, Chino Mines Division of Kennecott Copper Corporation, Santa Rita, New Mexico; first vice president John A. Wood, consulting engineer and geologist, Albuquerque, New Mexico; and second vice president T. A. Snedden, superintendent, Groundhog Unit of American Smelting & Refining Company, Vanadium, New Mexico. Wood and Snedden are newly elected officers for 1951.

Miners' Questions Answered

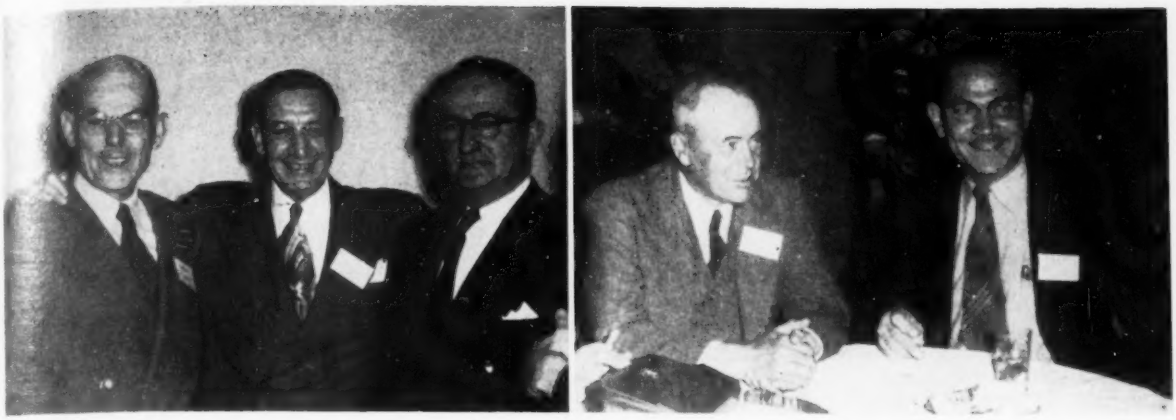
Questions were answered on the floor by East, Klein, Samuel H. Williston, former head of DMA's supply division, and Carl I. Dismant of Denver, RFC mining engineer. Results included the following:

Q. Have the defense agencies recognized that the deferment of miners from the armed forces is essential?

A. (East) The Department of Labor has issued a statement which says that an underground miner's work is a critical occupation.

Q. What will be the penalty if a government contract is not filled?

A. (Williston) There will be no



LEFT: The Atchison Topeka & Santa Fe Railway Company had a large delegation at the Albuquerque convention. Among those in attendance were, left to right, T. O. Evans, chief mining engineer; G. C. Lyman, general freight and passenger agent; and Tuck Rapyer. Evans was a featured speaker, describing Santa Fe's uranium developments at Grants, New Mexico. RIGHT: Among the many U. S. Bureau of Mines personnel at the meeting were, left to right, Hugh McLeod and John H. Soule. They are both stationed at the Bureau's Region IV office at Silver City, New Mexico.

penalty for contracted materials not delivered because orebodies do not come up to expectations.

Q. Will loans be made on a production basis repayment?

A. (East) If the operation is successful, repayment will be by a percentage of the milling receipts.

Q. Is there any special procedure in going to the RFC after a private bank refuses a loan?

A. (Dismant) The RFC cannot handle a loan if a bank will take it. If you are turned down, get a letter of refusal.

Q. How do I know which agency to go to first for a loan?

A. (Williston) If it definitely would be a commercial loan, go directly to the RFC; if it is a speculative loan, go to the DMA first.

Williston gave an off-the-cuff banquet address, sketching the roles of the 10 or more Federal agencies which "have a finger in the metals pie."

New Officers Elected

At the meeting the Association elected the following new officers:

President—T. M. Cramer of Carlsbad, vice president of the United States Potash Company. He replaces W. H. Goodrich of Hurley, general manager of the Kennecott Copper Corporation's Chino Division; first vice president—John A. Wood, consulting engineer and geologist of Albuquerque; second vice president—T. A. Snedden, superintendent for AS & R at Vanadium; directors—J. T. Lewis Jr. of Bayard and Homer Hirsch of El Paso, Texas, were newly elected to the 20-member board; and Jack C. Pierce of Albuquerque was reelected executive secretary.

Resolutions and Policy

Highlighting the miners' and prospectors' 1951 resolutions and statement of policy are the following:

We in New Mexico call upon the Administrators of National Defense to utilize the products of our efforts with the utmost wisdom, and with a minimum of confusion, overlapping authority and political intrigue.

We urge continued close cooperation between the Defense Minerals Administration, General Services Administration, Munitions Board and the Reconstruction Finance Corporation in applying their authority to a forceful, coherent minerals-production program.

We ask that a priorities system for small producers of strategic minerals be put into effect as quickly as possible.

We favor reduction or elimination of foreign economic aid to countries which may fall under enemy domination and make impossible the delivery of minerals from these areas to the United States or its allies.

Aid for domestic producers should consist of adequate prices to insure profitable and expanded operations, favorable import tax regulations, non-restrictive governmental procedures.

The mining industry should be given a 27½ percent depletion allowance on all minerals whether metallic or non-metallic, and production of mineral raw materials should continue to be exempt from renegotiation of Government contracts or subcontracts . . .

The Federal Government must avoid drafting large numbers of technically trained men and skillful miners out of the mineral industries for the Armed Services.

We are opposed to any moratorium on assessment work on mining claims for the year ending July 1, 1951 and believe that Congress should clarify its intentions in that regard at an early date . . .

Among other recommendations were those for the location of an ore purchase depot and strategic minerals stockpile in New Mexico and for "serious consideration (to) be given by the Atomic Energy Commission to the establishment of mills to beneficiate uranium ores from New Mexico."

For the first time in the history of the association, a governor attended the convention. Republican Edwin L. Mechem urged the miners to tell the people of the state about themselves, their work, and their problems. He observed that "there are too many people in the state who don't know what's going on in the mining industry in New Mexico."

Needed—A United Industry

In another major address, Robert S. Palmer, executive director of the Colorado Mining Association, called for a united industry.

While observing that "there are so few of us in the mining industry that we can ill afford to throw rocks at each other," he nevertheless asserted that "equal treatment for all . . . is all the small (mining) producer has sought."

He commented that "you cannot extend to the little operator only the drippings of a program and expect him long to support a national program sponsored by the major interests in the mining industry."

In the present emergency, Palmer went on, "we who are metal producers have a new assignment. We

Geological papers were a feature of the program. On hand to hear them were, left to right, Dr. Stuart Northrop, head of the geologic department at the University of New Mexico; Sherman Wengerd, professor of petroleum geology, and Dr. Vincent C. Kelley, professor of geology at the university; Bob Zeller; and Dr. Carl W. Beck, associate professor of geology.

are charged with responsibility of producing metals and nonmetallics under the most adverse conditions in our history." And he asserted that the time for action and clear thinking was here and for hoping that some of "the obstacles to greater mines and mining" will be removed.

"With the Spring Thaw our hopes are revived," he said. "Perhaps the voice in the wilderness has been heard for it is quite evident to the keen of mind that the trend is now to encourage domestic production.

"Let us hope that in spite of the planning of the planners who plan our future," he concluded, "that some of the red tape, some of the restrictions, some of the obstacles to greater mines and mining, will be removed."

Technical Sessions

In the technical discussions, Clay T. Smith, associated professor of geology at New Mexico School of Mines, said that uranium is 25th in abundance of the 92 known elements but that the problem is one of concentration and economic utilization.

Detailing the commercial, marginal, and submarginal (potential) deposits in the world, he wound up his talk with four cautions about the use of radioactivity detection equipment:

1. Most detecting instruments are not yet rugged enough for constant use in the field without periodic checks against laboratory equipment.

2. All that is radioactive is not uranium. Potassium, for example, often is radioactive.

3. Uranium is rather mobile, and chemical weathering may remove all traces of uranium as far as detection is concerned.

4. Ordinary rock and soil have a considerable shielding effect on radioactive deposits. About three feet of solid rock and a somewhat greater depth of soil will filter out 95 percent of the signal detected from radioactive substances. Fissures and other breaks, however, often give access to the surface from greater depths.

He said that in using detection equipment it is necessary to realize that: (1) complete and accurate data should be collected; (2) equipment must be handled by qualified and trained personnel; and (3) the best equipment should be used.

George O. Argall Jr., editor of *Mining World*, said the "simple and tragic truth is that Russia was the most powerful and dominating factor in mining" in 1950.

He compared gains made by the Soviet Union during the year with the gains of the free world; he sketched Russia's weaknesses in the mining field. Commenting on our declining mineral position, Argall observed that "our greatest ally, and the nation's greatest victory, has been time."

He expressed the hope that the government will see that "everything will be done to insure maximum production from all deposits both producing and unworked . . ."

Artillery Peak Manganese

East gave a report on the Bureau of Mines' Artillery Peak manganese project some 30 miles east of Parker Dam, Arizona. He cited official estimates that the deposits contain a minimum of 175,000,000 tons of manganiferous material, most of it averaging 3½ to 4 percent manganese. The project got under way last May, East reported, and ore removed from the headings so far totals about 6,650 tons, which has been stockpiled for use in metallurgical testing.

The ore will be trucked to Boulder City, Nevada, where the Bureau plans to build a $600,000 pilot plant to determine the most [illegible] metallurgical processes for treating low-grade manganese ores from various domestic deposits. Meanwhile, intensive metallurgical research is continuing on this "top priority" problem at Bureau experiment stations in both Salt Lake City, Utah, and Tucson, Arizona.

Harrison Schmitt, consulting mining geologist of Silver City, New Mexico, gave a talk on "The Sampling of Mineral Deposits, Theory and Practice." He stated that perhaps 90 percent of all sampling jobs can be confidently attacked by "standard" procedures. But in some cases other methods should be used, and he then outlined some such techniques for his audience.

1950 Potash Activities

"Potash Activities and Developments in Southeastern New Mexico During 1950" were explained by D. L. Libbey, geologist for the U. S. Potash Company.

The year 1950 was a progressive one for New Mexico's potash industry, even though the first month of the year found production impeded by a strike. In all phases of operation, production, development and exploration, satisfactory conditions existed by the end of this significant year.

The three operating companies and the two developing companies in the Carlsbad area in order of their appearance in southwest New Mexico are: United States Potash Company, Potash Company of America, International Minerals and Chemical Corporation, Duval Sulphur and Potash Company and Southwest Potash Corporation.

Libbey said, "All of the activities, developments, and production which have occurred in the past 24 years were materially augmented during the year 1950. This indicates that the Potash Industry in the Permian Basin of Southeastern New Mexico will continue to make our nation self-sufficient for its potassium requirements."

Other talks given at the convention were "Prospecting for Mineral Deposits in Areas of Volcanic Rocks."—Eugene Callaghan, director of the New Mexico Bureau of Mines and Mineral Resources; "Application of X-Ray and Differential Thermal Analysis in Explorations."—Carl W. Beck, associate professor of geology at the University of New Mexico; and "Mining Activities and Developments in Southwestern New Mexico During 1950."—Ward E. Ballmer, public relations officer of the Kennecott Copper Corporation's Chino Mines Division.

RUSSIAN MINERAL STRENGTH

Control of minerals in satellite countries plus increased domestic output brought Russian industrial might to an all time high in 1950

The following is an abstract of a report presented at the annual convention of the New Mexico Miners and Prospectors Association in Albuquerque, New Mexico, on February 17, 1951. It is presented here so that Mining World's readers can have a more complete understanding of Russian strength and weakness.—Ed.

Speaking of world mining developments in 1950, the simple and tragic truth is that Russia was the most powerful and dominating factor in mining, as well as in world unrest, affecting everything that transpired during the year. This is an unusual situation because in many other years, scientific and cultural developments having no bearing on mining were the outstanding events. In 1950, Russian aggression changed mining on a world-wide scale, and so changed the lives of every living person.

The territorial and political gains of the Soviet Union in 1950 are well known and there is no need to repeat them. However, a brief report on Russia's mineral position and her metal and mineral gains of 1950 will be given.

An Engineering Approach

Perhaps you will wonder how a report on Russia's mineral position can be given when such an "iron curtain" surrounds her. It is what the military would call an "estimate of the situation," or a physician his "diagnosis." It would not be surprising if the Communists call it the Marxian approach—provided, of course, it has been approved by the Kremlin.

An engineering approach to the Russian mineral situation began with the July, 1945, analysis published in MINING WORLD and subsequently brought up-to-date in March, 1948. Unfortunately, since that last report, information about Russia has been increasingly difficult to gather.[1] However, letters and cables from correspondents in many parts of the world and European publications, have from time to time contained information about mining in Russia and her satellites. An effort has been made to piece these reports together and to coordinate them with other information. Here are the conclusions:

Fourth Five-Year Plan

The year 1950 marked the end of the fourth Russian five-year plan and brought the U.S.S.R. to its greatest economic strength in history. Over-all industrial production was reportedly 70 percent larger than in 1940. Coal production of 260,600,000 metric tons compares with 166,000,000 in 1940 and steel production was 26,000,000 to 27,000,000 tons versus the 18,300,000 tons of 1940. Steel production was almost one-half of Premier Stalin's 1960 quota.

Great Possibilities

Russia is a gigantic land of some 8,400,000 square miles, compared to 3,022,387 square miles of the United States. It extends more than one-half way around the world longitudinally and 45° north to south. About 45 percent of the land surface is covered by sedimentary rocks, making a favorable environment for probably large deposits of mineral fuels. The wide variety of intrusive and extrusive igneous rocks are of many geologic ages and precambrian rocks also cover large areas. These suggest metalliferous deposits.

Light Metals

The light metals—aluminum and magnesium—are of great importance and Russia has made remarkable postwar strides in aluminum production, 1950 production being estimated at 200,000 tons by some and as high as 250,000 by a British source.

It is believed that part of the aluminum production is directly under the control of the Red Army or the N.K.V.D. because 25 to 35 percent of total production would have been needed to reach the aircraft production goal in 1949 of 25,000 airplanes.

Magnesium is produced at Solikamsk in the Urals using carnallite as a raw material. Post war production has been markedly increased by the transfer to Russia of the 12,000-ton per year Aken plant from East Germany and the 20,000-ton Moosbaum plant from the Soviet zone of Austria.

Copper

Under the fourth five-year plan, output was set at about 255,000 metric tons per year and probably has been reached. The Russian copper mining and smelting industries center in the Ural Mountains where an English company produced copper before World War I at Baimak.

A Russian version of a porphyry copper is the Kounrad mine on the shores of Lake Balkash in the Kazakstan region of central Asia. The orebody is reported to contain over 240,000,000 tons of one percent copper ore with molybdenum, gold, silver, and tungsten. A flotation mill started operations in 1938 and the smelter in 1939. This is one of the largest mine-to-metal operations in the Soviet Union and follows American practices in mining flotation, smelting and refining.

Lead and Zinc

The Chimkent lead smelter in Kazakhstan is reportedly Russia's largest. It treats ore from a number of deposits in the Kirghiz Republic and Turkestan. The Leninogorsk lead smelter in Eastern Kazakhstan treats ore from the well known Ridder mines. Zinc from the mines of the same area is reportedly treated in a new smelter at Ust-Kamenogrosk.

There are four zinc smelting centers in Russia. They are in the northern Caucasian area, the Belevo plant in western Siberia north of Mongolia and the Chelyiabinsk electrolitic zinc plant in the Ural Mountains which treats local ores. The Konstantinovka zinc plant in the Ukraine is believed to have been destroyed during the last war.

Manganese

Russia has long been noted as the largest producer of manganese ores in the world. This comes from two main deposits—one near Nikopol in

[1] Circulation of MINING WORLD-WORLD MINING was discontinued in the U.S.S.R., Poland, Hungary, Roumania, Bulgaria, Czechoslovakia and China several months ago.

the Ukraine, which was overrun and the mines damaged or destroyed by the Germans during World War II. The second is the Tchiatura district in Georgia in the Caucasus. There is no question of the fact that Russia is the only major steel producing country that has a superabundance of high grade manganese ore within its boundary. In 1940 Russia produced 3,000,000 tons of manganese, mostly from Nikopil deposits, and despite all efforts to regain this production it is now estimated that output of war damaged mines is only 60 percent of the prewar figure.

Iron

Ore production centers in the Ukraine at Krivoy Rog and in the Ural Mountains. In the Urals one of the largest Soviet mines is the Mount Magnitaya iron mine where a magnetic orebody oxidized to hematite is mined in a series of openpit benches. Prewar production of this mine was 5,500,000 tons per year. Some of this was treated in the nearby, gigantic Magnitigorsk, steel plant. The remainder was railed 1,500 miles southwest to the Stalinsk steel plant at Stalinsk in the Kuzbas region north of Mongolia.

Ferro Alloys

There is a superabundance of both manganese and the metallurgical chromite in Russia.

Russia has an adequate supply of nickel from the Petsamo deposits in Northern Finland taken by the Russians after World War II. Another plant at Moncheqorsk on the Kola peninsula recovers nickel, copper and cobalt. A new mine and plant at Norilsk in north central Siberia, placed in operation before the war, supplied badly needed nickel for armaments.

Molybdenum is recovered as a by-product at the Kounrad copper operation.

Tungsten is mined in the Lake Baikal area, at the Tyrny Auz mine in the Caucasus and in the southern Ural Mountains.

Russia's Post War Gains

Russia has gained control of important mineral deposits in satellite countries since World War II. They include the well known Silesian zinc-lead deposits of Poland where production was increased during 1949 but is still below prewar output. Also the Mansfeld copper mines of Eastern Germany where, according to reports, Russia is expanding mine output from 840,000 to 1,200,000 tons per year. 1950 copper output was probably greater than prewar. Rhenium and vanadium are important by-products of the copper ore.

In the Russian zone of Austria an important antimony mine is being operated in Burgenland Province.

In Albania large chromite deposits were investigated by Russian geologists and engineers during the past year. Russian geologists were also active along the Greek and Yugoslavian frontiers. A typical Russian pattern prevailed in Albania where the reorganization and control of the mining industry was directed by the Communist government.

In Bulgaria copper production in the Burgas area was increased with the output all being sent to Russia. A report of a uranium discovery was followed by a report that Russia had sent a military engineering mission to investigate it.

The extensive high grade bauxite deposits of Hungary are now controlled by the Hungarian and Russian governments. Control of these deposits may well be one of Russia's greatest post war mineral gains. A new alumina plant processing bauxite from these deposits is scheduled for 1951 completion.

In Roumania bauxite was also being developed as were copper deposits reportedly discovered in central Roumania in late 1950. A Russian mission searched for uranium deposits in the vicinity of Roumania's radioactive mineral springs.

Russian Mineral Strength

Now, an attempt will be made to draw some conclusions from these uncertain figures and unpronounceable mines as to Russian mineral strength.

Russians are quick to copy American methods and machinery. Much mining and metallurgical equipment was supplied by the United States under World War II lend lease and it undoubtedly has been copied by the Russians in the same manner as they have copied the World War II B29 heavy bomber.

The Russian engineers and geologists have a high position in the Soviet Union and the working men in the metallurgical plants are considered an elite group, and are the best paid and most efficient workers in the Soviet Union.

There is governmental certainty about their continual determination of effort.

Under the Russian system of forced production, often with slave labor, there is an entirely different concept of what constitutes ore than in the United States. Cost is of no great importance.

The Soviet mineral industry is not required to produce for both a high civilian standard of living and a large military machine.

A strict embargo has been placed on tungsten exports by the Chinese Communists so as to channel it into Russia where shortage still exists. Russian agents have also been actively buying tungsten ore in Portugal, and this has affected the Spanish market and caused a price rise on the world market.

The efforts of Russia to secure molybdenum from the United States in 1950, by trans-shipments are well known.

Apparent Weaknesses

Modern mass production methods depend on industrial diamonds for making dies, and cutting and polishing. Russia may be short of them as they are not mined there. Recent large-scale buying of diamonds in Belgium by Russian agents has been reported.

The Russian transportation system is poor compared to that of the United States. Many mineral deposits are in remote areas, thousands of miles from industrial centers and points of consumption. Modern highways and truck transportation do not exist in the Soviet.

Research and development lag behind that of the United States.

Like Washington, Moscow is also reorganizing her federal administration dealing with mining and a recent decree of the Presidium of the Supreme Soviet of the U.S.S.R. has separated the ministry of the metallurgical industry into ferrous and non-ferrous industries which control enterprises and organizations within the Soviet.

Comparative production figures of the United States and Russia are not as indicative as they might seem because the Russian military machine gets a much larger percentage than ours. Moreover, Russia has increased production of several metals since World War II contrasted with the decline of several in the United States.

Certain ferro-alloy shortages might well be one of Russia's weakest links.

Plant capacity from mine right through to the refinery is the basic weakness—not lack of mineral deposits. In an effort to overcome this weakness, Russia has stripped equipment from major metallurgical plants all the way from North Korea to East Germany since the end of the war—and put it to work for the Soviet.

IN 1895

Bucyrus-Erie installed the first successful elevator type placer dredge in the United States.

and

EVER SINCE: A GREAT NAME IN PLACER DREDGE DESIGN

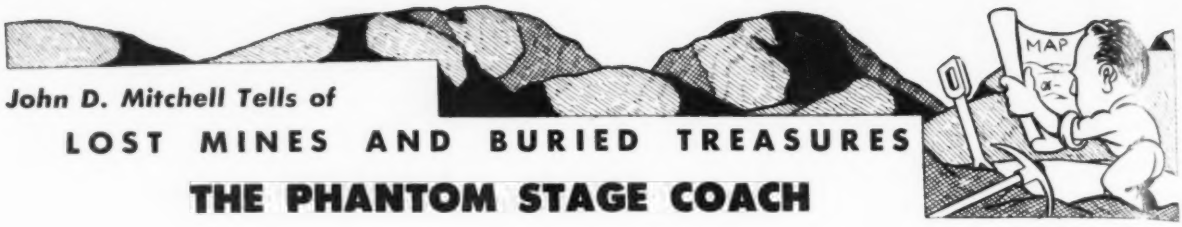
TODAY, as in the "nineties," Bucyrus-Erie sets the pace in the excavating industry — ashore and afloat. Its placer dredges are typical — matched to the *job* for long-term peak performance.

Your job is the starting point for Bucyrus-Erie engineers. They analyze the character and depth of the deposit, water supply, power and transport facilities, and other conditions peculiar to a specific operation. Balancing these factors with experience unique in the industry, they produce a dredge design geared to high output at lowest possible cost.

But that's not all. Bucyrus-Erie's complete manufacturing facilities provide on-the-spot control of *all* stages of production. That means real assurance of quality in materials and workmanship to match the top-notch *years ahead* design.

35D51

BUCYRUS ERIE SOUTH MILWAUKEE, WISCONSIN



John D. Mitchell Tells of

LOST MINES AND BURIED TREASURES

THE PHANTOM STAGE COACH

Forked lightning leaped from the black cloud that settled down like a hangman's cap over Stein's Peak. It silhouetted against the sky the gaunt walls of the old Butterfield stage station that stands on the flat near the northeastern base of the peak. A strong west wind was blowing through the pass, dull thunder rolled back and forth across the valley, and the rain came down in sheets and swirls. The yuccas were in full bloom, and each brilliant flash of lightning turned the snow-white blossoms into swaying ghosts with fleecy veils.

I stepped out of the tent and hurriedly dug a shallow trench around the edge and tightened the ropes as further protection against the raging elements. Just as I started to re-enter the tent my attention was attracted by the clattering hoofbeats of galloping horses and the creaking sound of an old-time stage coach or wagon being driven at high speed.

My first impression was that the cowboys on the ranch had been out with the chuck wagon and were rushing home ahead of the storm. As the sound grew louder and louder I realized that it was on the old fenced-up road that follows the shady wash.

On and on came the sound of clattering hoofs and grinding wheels. All at once four horses drawing an ancient Concord stage coach raced out of the thick brush, passed through a wire fence like a shadow, slipped down into the gulch, then up on the other side and across the flat in front of the old station within 20 feet of where I was standing. The bushy-whiskered driver, with head bent into the storm, threw something from the seat into the wide-open door of the station as the coach flew past. He then guided the horses down into the arroyo on the east side and continued across the flats. The sound of the horses' hoofs on the rocks and the creak-creak of the swaying stage soon died out in the distance. The wind and rain ceased, the dark clouds disappeared and the full moon hung like a silver disk in a clear sky.

Early the next morning Uncle Billy came up from Lordsburg to tell me what he knew about a buried treasure 30 steps from a certain ancient cedar tree in a pass to the south. Uncle Billy filled his pipe, pressed the tobacco tight into the bowl, and sat looking at the lighted match, seemingly lost in deep thought. Finally, when the rings of smoke started drifting up over the walls of the old station, he came to with a start and asked me if I had ever heard the story of the stage hold-up and the big fight that took place 'way back in the early sixties.

The bushy-whiskered driver, with head bent into the storm, threw something from the seat into the wide-open door of the station as the coach flew past.

Uncle Billy was very old, almost blind, and his memory did not seem any too good. However, I assured him that while I had read many historical accounts of numerous fights that had taken place in the bloody past, I had not heard the one he referred to at first hand.

"Well," said Uncle Billy, "the fight started high up in the pass when Peg-Leg Pete and his two partners and a large number of renegade Apaches tried to hold up the stage. On that particular trip it carried a small number of passengers, the mail, and a shipment of gold dust which was guarded by about 20 soldiers. While the guard was standing off the Indians and bandits, the driver put the whip to his horses and made a run for the station at the foot of the hill. He came down the hill at breakneck speed, threw the mail sack into the door of the station as he passed, but did not stop.

"The Indians and bandits evidently had anticipated just such a move for they had left a part of their force in an arroyo about one-half mile east of the station. As the stage dipped into the wash, they opened fire. The driver was killed, two of the horses wounded, and the stage coach turned over on its side. It later was set on fire.

"Among the passengers were three placer miners who were on their way to the East with $37,000 worth of gold dust which they carried in buckskin bags. With his gold bags clutched in one hand and a six shooter in the other, each miner scrambled out of the over-turned stage and put up a running fight

Continued on Page 77

ACTIVITIES OF U. S. MINING MEN

Oscar L. Chapman, Secretary of the Interior, has established, under the Defense Minerals Administration, the Tungsten Advisory Committee, the Antimony Advisory Committee, the Lead Advisory Committee and the Zinc Advisory Committee. Members of these committees, at last report, are as follows:

Tungsten:

H. S. West and *W. L. Long*, Tungsten Mining Corporation, New York; *Charles H. Segerstrom*, president, Nevada-Massachusetts Mining Company, Tungsten, Nevada; *James P. Bradley*, vice president, Bradley Mining Company, San Francisco; *J. H. Spillane* and *W. E. Remmey*, Union Carbide and Carbon Corporation, New York; *H. A. Savage*, president, American Tungsten Association, San Francisco; *David D. Baker*, of Reno, general manager, Strawberry tungsten mine near Bass Lake, California, and technical advisor for the Tungsten Producers' Association; *J. W. Hoefling*, Surcease Mining Company, Sacramento; and *K. C. Li*, chairman of the board, Wah Chang Corporation, New York.

Antimony:

James P. Bradley, Bradley Mining Company, San Francisco; *J. Eldon Gilbert*, Cordero Mining Company, San Francisco; *J. J. Oberbillig*, Boise, Idaho; and *Gloyd M. Wiles*, National Lead Company, New York.

Lead:

Oscar N. Friendly, vice president, Park Utah, Consolidated Mines Company, Salt Lake City; *James E. Hogle*, president, Rico-Argentine Mining Company, Salt Lake City; *Simon Strauss*, American Smelting & Refining Company, New York; *Charles R. Ince*, Bunker Hill & Sullivan Mining and Concentrating Company, New York; *Walter C. Page*, general manager, Western Division, U. S. Smelting, Refining and Mining Company, New York; *W. L. Ziegler*, general manager, Pend Oreille Mines & Metals Company, Metaline Falls, Washington; *Edward H. Snyder*, president, Combined Metals Reduction Company, Salt Lake City; *Gloyd M. Wiles*, manager, St. Louis Smelting and Refining Division, National Lead Company, New York; *Paul Jessup*, vice president, Day Mines, Inc., Wallace, Idaho; *W. H. H. Cranmer*, president, New Park Mining Company, Salt Lake City; *Felix E. Wormser*, vice president, St. Joseph Lead Company, New York; and *Elmer Isern*, Eagle-Picher Mining and Smelting Company, Picher, Oklahoma.

Zinc:

Marshall L. Havey, executive vice president, New Jersey Zinc Company, New York; *Howard I. Young*, president, American Zinc, Lead and Smelting Company, St. Louis; *O. W. Bilharz*, president, Bilharz Mining Company, Baxter Springs, Kansas; *J. H. Buchanan*, president, Nellie B. Mining Company, Picher, Oklahoma; *Paul H. Hunt*, general manager, Park Utah Consolidated Mines Company, Salt Lake City; *Joseph H. Taylor*, vice president, Peru Mining Company, Deming, New Mexico; *Cecil A. Fitch, Jr.*, general manager, Chief Consolidated Mining Company, Tintic, Utah; *Joe Kieffer*, general manager, Spokane-Idaho Mining Company, Wallace, Idaho; *Charles R. Ince*, Bunker Hill & Sullivan Mining and Concentrating Company, New York; *Kenneth C. Brownell*, president, American Smelting and Refining Company, New York; *Walter C. Page*, general manager U. S. Smelting, Refining & Mining Company, Salt Lake City; *Felix E. Wormser*, vice president, St. Joseph Lead Company, New York; *W. L. Ziegler*, general manager, Pend Oreille Mines & Metals Company, Metaline Falls, Washington; *Edward H. Snyder*, president, Combined Metals Reduction Company, Salt Lake City; *Gloyd M. Wiles*, manager, St. Louis Smelting & Refining Division, National Lead Company, New York; *Paul Jessup*, vice president, Day Mines, Inc., Wallace, Idaho; *W. H. H. Cranmer*, New Park Mining Company, Salt Lake City; *Elmer Isern*, Eagle-Picher Mining and Smelting Company, Picher, Oklahoma; and *Russell B. Caples*, vice president, Anaconda Copper Mining Company, New York.

John Van Nostrand Dorr, chairman of the board of The Dorr Company, Stamford, Connecticut, has been made a member of the Legion of Honor of the American Institute of Mining and Metallurgical Engineers in recognition of his 50 years of service as a member. He received the citation at the 71st annual meeting of the Institute at St. Louis, Missouri, in February.

Richard O. Marsten has been named superintendent of the new Cayia iron ore mine of Inland Steel Company at Crystal Falls, Michigan. He was formerly assistant superintendent of the Morris mine at Ishpeming.

W. L. ZIEGLER, general manager of the Pend Oreille Mines and Metals Company, Metaline Falls, Washington, has been appointed by Oscar L. Chapman, Secretary of the Interior, to the zinc and to the lead advisory committee of the Defense Minerals Administration. Also appointed to the lead committee was Harry W. Marsh of Boise, Idaho, secretary of the Idaho Mining Association.

J. H. Buehler, general manager of Bristol Silver Mines Company, Pioche, Nevada, has been appointed to the Colorado River Commission by Governor Charles Russell of Nevada.

A. S. Walter, consulting engineer of Socorro, New Mexico, has been making mine appraisals on military projects for several years in New Mexico. He also is consulting engineer for the Boise Basin Mining Company of Boise, Idaho.

Norman Visness has joined the engineering staff of the Federal Mining and Smelting Company of Wallace, Idaho. He is a graduate of Montana State School of Mines, has worked for Anaconda Copper Mining Company and recently was district sales engineer for the Joy Manufacturing Company.

W. P. WOLFF of Hibbing, Minnesota, has been named president of the Engineers' Club of Northern Minnesota. He is chief engineer of Oliver Iron Mining Company. Other officers are T. C. Thielman of Elcor, superintendent at Pickands, Mather & Company's Embarrass mine, who was named vice president; and Hugh J. Leach of Marble, superintendent at Cleveland Cliffs Iron Company's Hill-Trumbull mine, secretary-treasurer.

Dr. Robert F. Mehl, head of the department of metallurgy of Carnegie Institute of Technology, is chairman of the Metallurgical Advisory board of the Department of Defense; *H. V. Schnee*, vice president of the University of Oklahoma and director of its research institute, has been made MAB's executive director; and members of the board are: *Dr. E. C. Bain*, assistant vice president of U. S. Steel Corporation; *Dr. John Chipman*, head of the department of metallurgy, Massachusetts Institute of Technology; *Dr. Charles H. Herty, Jr.*, assistant to the vice president, Bethlehem Steel Company; *Dr. Zay Jeffries*, retired vice president of General Electric Company; *Walter E. Jominy*, supervisor of metallurgical research, Chrysler Corporation; *Dr. A. B. Kinel*, president, Union Carbide & Carbon Research Laboratories, Inc.; *Dr. Paul D. Merica*, executive vice president, International Nickel Company of Canada, Ltd.; *Dr. Albert J. Phillips*, director of research, American Smelting & Refining Company; *Leo F. Reinartz*, assistant vice president and manager, Armco Steel Corporation; *Dr. Cyril S. Smith*, director, institute for study of metals, University of Chicago; *Earle C. Smith*, chief metallurgist, Republic Steel Corporation; *Dr. Kent R. Van Horn*, associate director of research, Aluminum Company of America, and *Dr. Clyde Williams*, director, Battelle Memorial Institute. The main concerns of the Metallurgical Advisory Board are the study and development of critical and strategic metals and their substitutes (particularly columbium, tantalum, cobalt, titanium, molybdenum, tungsten and beryllium), application of metals used at high temperatures, and development of the titanium industry.

F. H. Hayes, acting director of the National Production Authority's Miscellaneous Metals and Minerals Division, U. S. Department of Commerce, presided at a meeting held recently to determine ways of supplying sufficient platinum for defense and other essential requirements. Among 12 men representing the platinum industry were: *Marc Goldsmith* of Goldsmith Bros. Smelting & Refining Company, Chicago; *Walter Kerrigan* of International Nickel Company, Inc., New York; *Ross Hayes* of American Platinum Works, Newark, New Jersey; and *Charles W. Stones* of J. Bishop & Company, Platinum Works, Malvern, Pennsylvania.

L. J. ERCK, chief metallurgist, Cleveland-Cliffs Iron Company, is head of the company's new research laboratory at Ishpeming, Michigan. Although the normal working force of the laboratory is 15 to 20 men there are now 29 working at it. Erck, in a recent speech, said that the "laboratory, in essense, represents the future of the Cleveland-Cliffs Iron Company and in a larger sense the future of the Lake Superior district." The higher steel consumption in the U. S., meaning more iron ore from already depleted high grade reserves, has inevitably meant expensive and extensive research into economically feasible means of recovery of lowgrade ores.

Dr. R. E. Zimmerman, vice president and director of United States Steel Company, has been named chairman of the company's new Research Policy Committee, according to an announcement by President *Benjamin F. Fairless* from Pittsburgh, Pennsylvania. The new committee was created so as to place increasing emphasis on research in U. S. Steel Corporation's mining, manufacturing and distributing subsidiaries. The other members of the committee are representatives from the corporation's subsidiaries.

Francis H. Brownell has retired from the board of American Smelting and Refining Company, New York, after 35 years on the board and 17 years as chairman. He had been associated with the company from 1903 on. In 1910 he was made president of the Federal Mining and Smelting Company, an AS&R subsidiary, and remained president, with the exception of one four-year period, until 1948, when he resigned.

Robert H. Sayre, Jr., is supervising mining operations now for the Old Hundred Gold Mining Company, Silverton, Colorado. He had been with the Pride of the West Mine.

Roland D. Parks has been appointed an associate of Behre Dolbear & Company, mineral consultants, New York. He will continue to be associate professor of mineral industry at Massachusetts Institute of Technology, Cambridge.

Lowell B. Moon has been appointed chief of the Minerals Division of the U. S. Bureau of Mines, according to an announcement from Washington by *Oscar L. Chapman*, Secretary of the Interior. Moon, a mining engineer and geologist who has been with the Bureau since 1939, will work closely with the Defense Minerals Administration.

Albert Crase of Grass Valley, California, has been elected president and general manager of Idaho-Maryland Mines Corporation at Grass Valley. He succeeds *E. L. Oliver*, who resigned. Three other personnel changes were reported: *William L. Oliver* resigned as a director; *F. W. McNear* resigned as a director and vice president and is now assistant treasurer; and *C. L. Allan* resigned as a director but is continuing as secretary-treasurer. Elected to replace William Oliver, McNear and Allan in their former positions were *George Harrington*, now chairman of the board; *Max Bechold*, now a director and vice president; and *Bert C. Austin*, a director.

E. R. Bechtel, chief chemist and supervisor of ore movement for the Oliver Iron Mining Company, retired on February 1st after 42 years with the Oliver Iron Mining Company, Duluth, Minnesota.

Samuel H. Williston of the Cordero Mining Company, San Francisco, California, has resigned from his position as director of the Supply Division of the Defense Minerals Administration.

Howard L. Hartman has moved to Minnesota and will instruct courses in mine plant and engineering construction at the University there, as well as work for a Ph.D. in mining engineering. He had been an engineer with Phelps Dodge Corporation in Arizona and worked for the Arizona State Mine Inspector.

Robert W. Lea, who is retiring as president of the Johns-Manville Corporation, has joined Olin Industries, Inc., for which he has been a director since April, 1950.

Thomas F. Edson, formerly in charge of construction of Victor Chemical Works phosphorous plant at Silver Bow, Montana, is now executive assistant to *Rothe Weigel*, president, and has moved to Chicago. He has been succeeded at Silver Bow by *Clarence G. Derick*, who is also in charge of mining operations at Maiden Rock. Production superintendent of the plant is *Charles A. Hendrickson*, formerly of Tarpon Springs, Florida; and in charge of phosphate rock mining operations is *William Anderson, Jr.*, of Butte.

Dr. Bruce W. Gonser has been named assistant director of Battelle Institute, Columbus, Ohio, a newly created post. He will direct Battelle's study of metallurgy and the chemistry of metals and research in non-ferrous metallurgy. He joined Battelle in 1934, is American manager of the Tin Research Institute, chairman of the Rare Metals Committee of the Electrochemical Society and chairman of AIME's committee on Reduction and Refining of Titanium and Uncommon Metals, among other activities. Two other men have been appointed to new positions at Battelle Institute recently: *Dr. Robert I. Jaffee*, who will be supervisor of research in non-ferrous physical metallurgy; and *Dr. Ivor E. Campbell*, who will be supervisor of research on chemical problems in non-ferrous metallurgy.

Clarence Sleeman, engineer for Inter-State Iron Company's Hill-Annex mine, Calumet, Minnesota, has been transferred to Virginia, where the general mining offices are, as assistant chief engineer.

Francis M. Aimone has joined the staff of the Mineral Dressing Laboratory of the American Cyanamid Company at Stamford, Connecticut. He is a native of Cobalt, Ontario, Canada, and attended the University of Toronto, where he received a B.A. degree in metallurgical engineering. His first job was with Macassa Mines at Chaput Hughes, Ontario. He then returned to the university to fulfill a wartime government assignment. Just prior to joining American Cyanamid he was in charge of the Casapalca concentrator of the Cerro de Pasco Copper Corporation in Peru. He is a member of the AIME and of the Canadian Institute of Mining and Metallurgy.

Clifford F. Rassweiler has been elected to the newly created position of vice chairman of the board, Johns-Manville Corporation, New York. *Leslie M. Cassidy* has been elected president to succeed *R. W. Lea*, retiring, and *Adrian R. Fisher* has been made vice president in charge of asbestos mining. *J. P. Syme*, formerly vice president and assistant to the chairman, has been named assistant vice chairman.

W. E. Haldane of Minerals Engineering Company, Grand Junction, Colorado, recently was elected president of the Independent Uranium-Vanadium Producers Association. Elected as both vice presidents and directors were *R. O. Dulaney* of F. A. Sitton, Inc., Cortez, Colorado; and *Howard W. Balsley*, Moab, Utah. Elected as directors were *T. H. Skidmore*, Gateway, Colorado; *Abe Day*, Moab, Utah; *Chester Wright*, Greenriver, Utah; *Fred Trudeau*, Placerville, Colorado; *Lew Williams*, Norwood, Colorado; and *A. C. MacDonald*, Delta, Colorado.

T. L. Joseph, assistant dean of the Institute of Technology, University of Minnesota, has been named division chairman of the American Institute of Mining & Metallurgical Engineers.

William Wittmeyer of Minneapolis has resigned his position with the U. S. Bureau of Mines and opened an office for private engineering work at Marysvale, Utah.

Blair Burwell, general manager of the Climax Uranium Company, Grand Junction, Colorado, has been elected president of the Colorado Mining Association. Vice presidents elected were *J. Paul Harrison*, manager, Colorado operations of the American Smelting & Refining Company; *Harrison Cobb*, Boulder County tungsten miner; *Charles Chase*, executive vice president of the Shenandoah-Dives Mining Company; *H. S. Worcester*, assistant general manager of the Golden Cycle Corporation; and *E. D. Dickerman*.

W. H. Munds is the first of three engineers who will be added to the U. S. Bureau of Mines staff at Joplin, Missouri. He is a graduate of the University of Arizona, and has had 30 years of mining experience.

C. H. RIEMAN, since 1948 district manager for Gardner-Denver Company at Duluth, Minnesota, has been appointed manager of the company's Mining Division, taking the place of the late A. W. Dale. Rieman started as a salesman at the company's Quincy, Illinois, home office in 1937, later spent eight years selling out of the San Francisco branch office, and then went to Duluth. He is a graduate of the University of Minnesota School of Mines.

Mining Men Need MINING WORLD!

If mailed from outside United States, place postage stamp here →

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

FIRST CLASS PERMIT No. 334, Sec. 34.9 P. L. & R., Seattle, Wash.

MINING WORLD

SUBSCRIPTION DEPARTMENT

71 Columbia Street

SEATTLE 4, WASH., U. S. A.

Subscription Dept., MINING WORLD

Please enter my subscription to MINING WORLD which will include the annual Mine Development and Directory Number . . . . 13 issues yearly . . . . . .

	U.S., No. & So. America	Other Countries
☐ Three years	$7.00	$10.00
☐ Two years	5.00	7.00
☐ One year	3.00	4.00

☐ Remittance Enclosed
☐ Bill me Later

FROM ALL STERLING AREAS, subscriptions in Sterling accepted if sent to P.J. SERGEANT, MINING WORLD, c/o Barclays Bank, 72/73 Cheapside, London E.C.2. Rates: One year, 28s. 6d. Two years, 50s.

FROM CANADA, Canadian currency will be accepted if sent to MINING WORLD, Royal Bank Bldg., Vancouver, B.C.

USE BLOCK LETTERS

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Fill in Card — Drop in Mailbox

gets more work done

Ability to hang on to temporary overloads...with a minimum of shifting...is one of the important reasons for the outstanding performance of these two newest tractors

The HD-9 and HD-15 build up greater drawbar pull faster . . . hold it longer than ever thought possible in gear transmission tractors.

For example, when tough going has pulled travel speed down 40 percent, these tractors will have increased their drawbar pull almost 20 percent over rated pull. They will lug down almost 45 percent from rated travel speed before drawbar pull even starts to fall off.

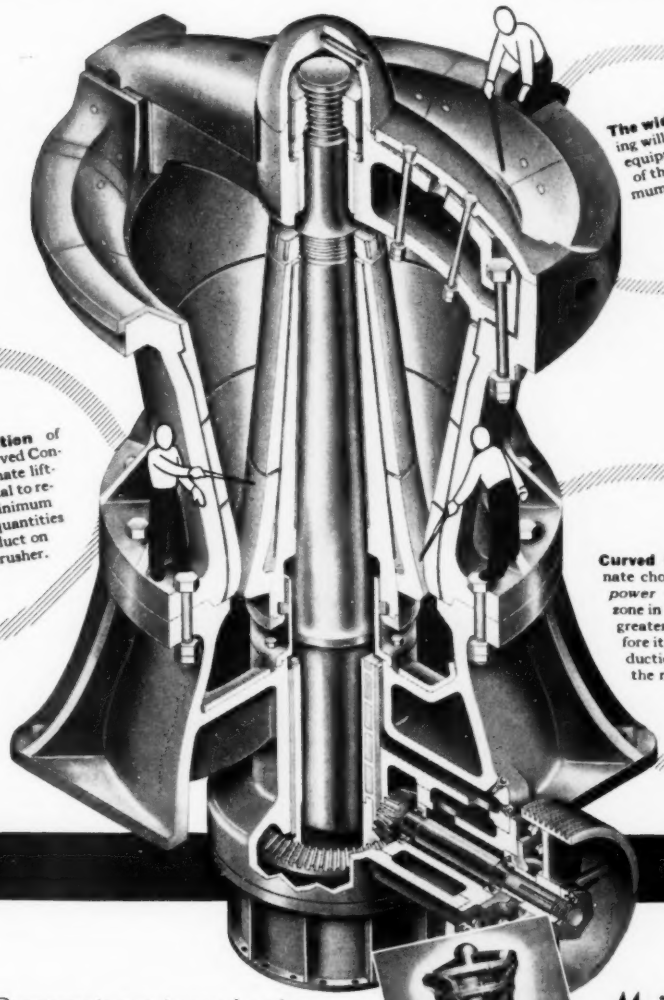
To take full advantage of this important GM 2-Cycle Diesel engine characteristic, the HD-9 and HD-15 have longer truck frames, lower idlers and sprockets. That means more track on the ground . . . better stability . . . sure-footed traction . . . unequalled *lugability*.

Your Allis-Chalmers dealer has graphic proof of HD-9 and HD-15 lugging superiority. Ask him to show it to you.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

The Newest, Finest Tractor Line on Earth

Here's why a Traylor TC Gyratory Produces so much at so little cost



The wide angle of the feed opening will team up with your heaviest equipment to permit reduction of the largest rocks with a minimum of preliminary breaking.

By the efficient application of crushing force, Traylor's Curved Concaves and Bell Head eliminate lifting and churning of material to reduce waste fines to a minimum . . . . . produce greater quantities of uniform cubical product on the first pass thru the crusher.

Curved Crushing surfaces eliminate choking and packing . . . *and power waste.* Each succeeding zone in the crushing chamber has greater capacity than the one before it. Steady, dependable production without interruption is the result.

The Traylor TC Gyratory is a primary breaker of great efficiency and huge capacities. Its overall sturdiness of design provides adequate mass for shock absorption. It's a big crusher built to do a big job. Any plant of 10,000 tons daily capacity or over will operate at greater efficiency with a Traylor TC Gyratory. Free bulletin gives complete details . . . sizes . . . capacities. Mail coupon for your copy today.

Mail Coupon for Full Information

TRAYLOR ENGINEERING & MANUFACTURING CO.
336 MILL ST., ALLENTOWN, PA.

Give me the details on a Traylor TY Gyratory Crusher . . . especially on its economical operation.

*Name*_____

*Company*_____

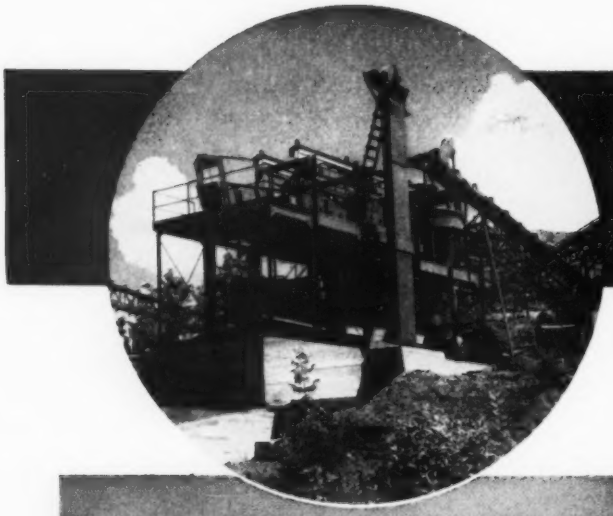
*Address*_____

SALES OFFICES: New York, N.Y.; Chicago, Ill., Los Angeles, Calif.
Canadian Mfrs: Canadian Vickers, Ltd, Montreal, P.Q.

Traylor

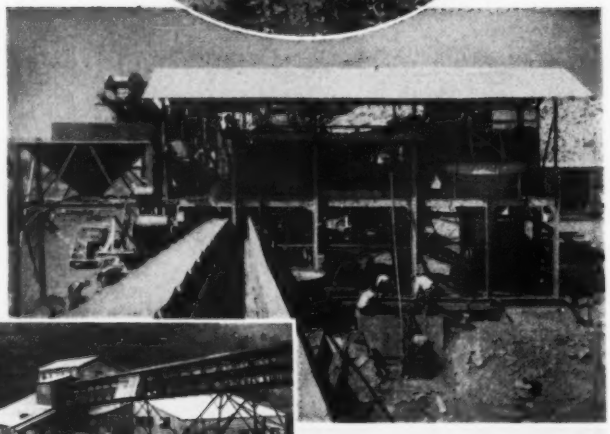
Rotary Kilns, Coolers and Dryers · Grinding Mills
Jaw, Reduction and Gyratory Crushers · Crushing Rolls

A "TRAYLOR" LEADS TO GREATER PROFITS



26 [illegible]

WITH 52 WEMCO MOBIL-MILLS



INDUSTRY-WIDE ACCEPTANCE of the WEMCO MOBIL-MILL is demonstrated by this outstanding record of use (*average rated capacity) by operators in both the metallic and non-metallic mining fields. The success of these prefabricated heavy media plants is the result of five important advantages:

- ***PREFABRICATION*** — *furnished complete, ready to install*
- ***INSTALLED FOR YOU*** — *by skilled WEMCO field crews*
- ***LOW COST*** — *both initial cost per ton capacity and operating costs are low*
- ***CLEAN SEPARATION — HIGH RECOVERY*** — *due to accurate easily controlled HMS process*
- ***WIDE APPLICATION*** — *due to amenability of HMS to a wide variety of ores*

VERSATILITY of the Mobil-Mill is demonstrated by its efficiency in milling a wide variety of minerals, including:

GALENA	BROWN IRON ORES
BARITE	BASE METALLICS
HEMATITE	ANTHRACITE COAL
FLOURSPAR	BITUMINOUS COAL
GRAVEL	SPODUMENE
LEAD-ZINC SEMI-SULPHIDES	DIAMONDS

WEMCO MOBIL-MILLS may be rented or purchased in several sizes to treat from 5 to 275 T. P. H. feed. Design flexibility and the use of either cone or drum type separator make possible a Mobil-Mill to fit your special requirements at no extra cost.

WRITE TODAY *for information on the application of Mobil-Mills to your milling needs.*

WEMCO

WESTERN MACHINERY COMPANY

760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

WKE (HMS) Mobil-Mill • Coal Spiral • Standard Thickeners (HMS) Thickeners • (HMS) Media Pumps • Hydroseparators (HMS) Densifiers • (HMS) Separatory Cones • "SH" Classifiers Sand Pumps • Conditioners and Agitators • Fagergren Flotation Machines • Dewatering Spirals • (HMS) Laboratory Units

PRINCIPAL OFFICES

San Francisco • Sacramento • Salt Lake City • Spokane
Pocatello, Idaho • Denver • Phoenix • Tucson • Chicago
Hibbing, Minnesota • Bartow, Florida • New York

EXPORT DISTRIBUTORS

The Ore and Chemical Co.
80 Broad Street • New York 4, N.Y.

Continental Europe and North Africa

Dr. Ing. Herbert Lickfett, A/B, Stockholm 3, Sweden
S. E. M. U. Paris, France
Ferdinand Egeberg & Company, Oslo, Norway
Midec, Milan, Italy
A. Schuberth & Company, Basle, Switzerland
G. Maltsiniotis & Co., Athens, Greece
Agence Miniere & Maritime, S. A., Antwerp, Belgium
Adil Gubay & Albert Koenka, Istanbul, Turkey

Fraser & Chalmers (S. A.) Ltd., Johannesburg, South Africa
Lilestone & Co., Inc., Manila, Philippines

"Washington calling!"

We were expecting this call. In a sense it is the people of America on the other end of the telephone. For some time they have been calling upon our government to take whatever steps are necessary to equip our fighting men for any job they may have to do.

Korea has proved the fallacy of limited preparedness. You know now that the nation is girding for survival. The people of America have said—and rightly—that private industry should provide the Armed Forces with whatever is necessary.

Machines are being mobilized. "Caterpillar" products are wearing olive drab once more. Because of large military demands your present machines may have to work longer than you had anticipated.

You can get many extra hours of machine service life if you:

1 **Follow a sound program of operation and maintenance.**

2 **Consult your Operator's Instruction Book, using it as a constant guide in caring for your machines.**

3 **Secure the assistance of your "Caterpillar" dealer who now, more than ever before, is your working partner for the grim job that may lie ahead.**

• • •

CATERPILLAR TRACTOR CO., SAN LEANDRO, CALIF.; PEORIA, ILL.

CATERPILLAR

REG. U. S. PAT. OFF.

Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment

GRAB SAMPLES From the Mail

Stacking Conveyor Information Sent to Africa

Dear Sir:

In the MINING WORLD published in October, 1950, I [illegible] a very interesting article about the plant and equipment instal[illegible] at the Eagle Mountain iron ore mine of the Kaiser Steel Cor[illegible]tion.

As my company is starting an operation of a very similar na[illegible] I was particularly interested in the various items of equipment. I shall be very much obliged if it is possible for you to send me some information about the stacker conveyor used for the stockpile. A small sketch together with some ideas of how the stacker belt is driven would be of great use to me.

Any help given by you will be greatly appreciated.

B. C. Alberts
Mine Manager
South African Iron and Steel Industrial Corporation Limited
Thabazimbi, Transvaal
Union of South Africa.

Photographs and sketches of the stacker at Eagle Mountain and the stockpile system at Round Mountain Gold Company's Round Mountain, Nevada (MINING WORLD, June 1950) operation have been forwarded to Mr. Alberts. MINING WORLD'S engineering staff hopes they will prove useful.—Ed.

Placed in Contact for Samples

Dear Sir:

I thank you very much for sending WORLD MINING. It furnishes us with important information.

Referring to the news on page 43 of the July 1950 issue of WORLD MINING under the head "Uncrystalline Beryl is Found in New Mexico," I have to write to you that I am much interested in beryl ore, which is my chief line in mining. It would be very helpful to me if I can get detailed information about this uncrystalline beryl. I would feel highly obliged if you can arrange to send me details together with some samples or put me in contact with the mining concessionaires.

S. R. Surana
Mines Owner and Minerals Merchant
Beawar, India.

Scrutinized for Current Information

Dear Sir:

In your issue for December, 1950 you refer on page 24 to a report released at Salt Lake City Utah, on August 28th by Mr. R. L. Wilcox, chief of the Nonferrous Branch of the Economic Cooperative Administration.

This is the first mention we have seen of the report in question and we shall be glad to know whether you could obtain a copy for us.

Incidentally, we always promptly scrutinize your magazine as soon as it is received as we find it contains so much information of current interest.

L. V. Chilton
Manager, Intelligence Department
The British Aluminum Company Limited
Salisbury House
London Wall, London E. C. 2
England.

Through the cooperation of Mr. Wilcox and Mr. Julian Conover a copy of the report has been obtained and mailed to the British Aluminum Company.—Ed.

Great Interest for Lucid Descriptions

Dear Sir:

I thank you for the regular receipt of WORLD MINING during the past year and I hope you will continue to send it.

It is of great interest and value to me on this isolated island: both for news of development in countries where I formerly practiced, and for the lucid descriptions of new machinery and methods.

J. W. C. Treeby
Consulting Engineer
St. Paul's
Grenada, British West Indies.

INTERNATIONAL PANORAMA

SALT LAKE CITY—An all-time record for gold production in Utah was established in 1950 when 460,000 ounces was produced.

NEW ORLEANS—The Kaiser Aluminum & Chemical Corporation will build a new aluminum reduction plant in St. Bernard Parish, Louisiana, at a cost of $79,000,000. The plant will process bauxite from mines to be developed in Jamaica.

TORONTO—Noranda Mines, Ltd. will develop a large, low grade copper deposit in the Gaspe Peninsula section of Quebec. Large scale operations are planned because the deposit averages only about one percent copper.

WASHINGTON—Columbium continues to be in short supply and 98 percent of the available supply is being used in defense production.

LEOPOLDVILLE—Production of tin in concentrates in the Belgian Congo and Ruanda-Urundi increased in 1950 to 14,558 tons. The 1949 production was 3,760 tons.

MELBOURNE—King Island Scheelite (1947) Ltd. has signed contracts with the United States and British governments for long-term shipments of tungsten concentrates valued at $15,680,000. The United States contract is for seven years and the British for five.

WASHINGTON—The Munitions Board has reduced its purchases of copper for the domestic stockpile by 50 percent. The reduced rate is for an indefinite period subject to tri-weekly review by the Board members.

STOCKHOLM—During 1950 Sweden exported 12,900,000 tons of iron ore. This is a slight increase over the 1949 exports of 12,700,000 tons.

WASHINGTON—The delivery and use of all manganese ores containing over 35 percent manganese have been placed under allocation control by the Defense Minerals Administration of the Department of the Interior.

BOGOTA, COLOMBIA—A contract for $20,000,000 worth of equipment for a new integrated steel mill now under construction has been signed. It will be the first Colombian steel mill and the third largest integrated steel mill in South America.

WALLACE, IDAHO—Day Mines, Inc. is acquiring two additional mines in the Coeur d'Alenes. The two newest additions to the Day group are the Gold Hunter mines and the Independence lead mines.

WASHINGTON—The United States State Department has established six secret international committees to speed up production, allocation and control of strategic and scarce materials. Four of the committees will deal with metals as follows: sulphur; copper, zinc and lead; tungsten and molybdenum; manganese, nickel and cobalt.

OSLO—Exploration drilling and pilot-plant research in the Dunderland iron ore field of Norway will be partially financed by ECA dollars. The Norwegian mining firm of Rana Gruber A/S will furnish additional funds and supervise the work.

JOHANNESBURG—The Dominion Iron & Steel Corporation, Ltd. has been formed to build a Krupp-Renn-process pig iron plant at Airlie, Eastern Transvaal. The plant will treat local iron ore deposits.

GRAND JUNCTION, COLORADO—The U. S. Atomic Energy Commission has announced a new bonus for domestic uranium production and a price increase for Colorado Plateau ores. The new, graduated bonus, of up to $35,000, will be paid to new mines and some existing mines for initial production and delivery. The higher price for ores, $1.50 to $3.50 per pound of uranium, will be paid according to the grade of the ores.

BOGOTA—The Chemical Construction Company is building a plant to recover sulphur from low-grade sulphur-bearing deposits found in extinct Andean volcanoes.

PARIS—Steel-output expansion plans for Europe call for a yearly capacity of 75,000,000 tons in 1953. European steel production outside Russia in 1950 was 60,700,000 tons.

DULUTH—The Oliver Iron Mining Company has awarded the stripping contract for the King openpit mine at Coleraine to the Morrison-Knudsen Company of Boise, Idaho. The contract calls for removal of 2,500,000 cubic yards of overburden.

LA PAZ—The Bolivian tin producers, excepting the Patino Mines and Enterprises Consolidated, have entered into agreement with the Reconstruction Finance Corporation for delivery of tin concentrates to the end of 1952. RFC buys tin concentrates and operates the Texas City, Texas, tin smelter.

BAY STE. ELAINE, LOUSIANA—The Freeport Sulphur Company has leased a sulphur dome from the Texas Company and will build a plant to recover sulphur, using the Frasch process. Four other domes, Dog Lake, Lake Pelto, Venice, and Garden Island Bay, have also been leased and will be explored for sulphur.

WASHINGTON—The General Services Administration has stopped all purchases of tin for the national stockpile. The policy is expected to continue until the price of tin reaches a reasonable level.

LONDON—The Diamond Trading Company and the Industrial Distributors, Ltd. have announced price increases for diamonds. The new prices will include all qualities and sizes of diamonds. Prices will be raised so that diamond prices in Sterling will be at full parity with diamond prices in dollars.

GLENDIVE, MONTANA—The Chromium Mining & Smelting Corporation of Canada is considering the erection of a two-furnace electric smelter to treat Montana's low grade chrome ore and concentrates. Estimated smelter cost is $1,500,000.

MORRISVILLE, PENNSYLVANIA—Construction of the 1,800,000-ton Fairless steel plant of the United States Steel Corporation has been started. The plant is scheduled for production in 1952.

NEW YORK—Imports of lead, in all forms, reached an all time high in 1950 at 520,586 tons. This was an increase of 35 percent over 1949.

Uranium Recovered From Phosphates by New Method

The United States Atomic Energy Commission has developed a process whereby uranium in phosphates can be extracted economically in the production of highly refined fertilizer known as triple superphosphate.

In the production of triple superphosphate, phosphoric acid is produced at one stage. In the production chain, between the phosphoric acid stage and the final stage, it appears to be feasible with the new process to extract uranium from the phosphate by attaching special equipment to the facilities used in the production of the fertilizer.

It has been well known for some time that uranium occurs as a very minor component in phosphate deposits in Idaho, Montana, Wyoming and in Florida. Considerable research work has been done to develop a process whereby uranium can be extracted economically from these very lowgrade sources. That the new process will open a new source of uranium is hoped. The process is classified and cannot be described.

Kaiser Will Raise Bauxite And Aluminum Output

Kaiser Aluminum & Chemical Corporation announced last month that it is buying a 280-acre site along the Mississippi River near New Orleans, Louisiana, for construction of a new 200,000,000-pound per-year aluminum reduction plant and power facilities. The site is being bought from the New Orleans Terminal Company. Kaiser will invest $79,000,000 of private funds for the following program:

Construction will be rushed immediately on the reduction plant with four potlines, which will raise the corporation's capacity to a total of 540,000,000 pounds of aluminum pig annually, thereby boosting overall expansion in capacity by 80 percent since last June.

The corporation will construct its own power plant at the New Orleans area site and will use up to 70,000,000 cubic feet of natural gas a day as fuel in generating electricity.

Bauxite properties which Kaiser has in Jamaica will be opened up to supplement other sources of the basic raw material, and the alumina made from it will supply the new Gulf Coast plant as well as Kaiser's two reduction plants in the State of Washington. Development of the bauxite property will include mining operations and the construction of port and shipping facilities.

The corporation's bauxite plant at Baton Rouge, Louisiana, will be expanded and modified to handle the Jamaican bauxite and to increase alumina production 80 percent, from 300,000 tons a year to 540,000 tons.

More than 1,000 persons will be directly employed at the reduction and power plants near New Orleans, and completion of the Baton Rouge expansions will increase employment to 700 persons.

The "Great Dyke" is about three miles wide in the Umvukwe district. The majority of the outcrops have been opened to an inclined depth of about 12 feet. These outcrop workings can be seen in the picture above. Note the network of excellent roads reaching the mining areas.

ELECTRIC DRILLING IN RHODESIA

The Rhodesian chrome mines are now using electric rotary drills with tungsten-carbide bits to lower costs and increase labor efficiency

The following article compares the merits of electric rotary drills and pneumatic percussion drills in the conditions encountered in the Umvukwe chrome mines of Southern Rhodesia. It was prepared by the Department of Mining Engineering, Southern Rhodesia.

Introduction of Electric Drills

The drills were first tried out in October 1948, in a section of the African Chrome Mines, Ltd. This was followed by tests at the Vanad mines of the Rhodesian Vanadium Corporation and later at the Birkdale and Springs Imshi mines. Several initial difficulties were finally overcome by the correct choice of drilling bits and a means of reducing the rapid wear on the spiral drill rods. By June 1949 20 drills were in operation and by October 1950 the number had risen to 95 and is still increasing. Prior to the introduction of the electric drill more than 30 light Jackhammers were in use, now there are none. Proven: The outstanding success of electric drills.

The Umvukwe Chrome Deposits

The mines are all situated in the serpentine rocks associated with the "Great Dyke," which stretches for over 300 miles across Southern Rhodesia. The Umvukwe district covers nearly a hundred miles of the most northern portion of the Dyke. The chrome mines extend for a distance of fifty-five miles along this area.

TABLE NO. I
Summary of Drilling Costs in Pence per Foot Drilled

Item	*Cost per Foot* Pence	Cents
Steel and bit cost	0.26	0.30
Power	0.08	0.09
Labor	0.75	0.88
Depreciation on equipment	0.50	0.58
Total	1.59	1.85

The seams of chromite normally dip inwards from the edges of the Dyke at a usual angle of from 30 to 35 degrees, and tend to flatten in depth. The average thickness of the seams is seven inches. The maximum number of seams outcropping upon either the east or the west side of the geological center line of the Dyke is seven. The majority of the outcrops have been opened up by shallow workings to an inclined depth of about 12 feet. The Dyke, about three miles wide in the Umvukwe area, forms a pronounced range of hills. The altitude of the area varies from 4,500 to a little over 5,500 feet above sea level.

Nearly all of the drilling is done in serpentine. The rock is drilled and blasted to a height about three feet above the seams. The exposed chromite is then lifted with the minimum of blasting to keep it lumpy and clean.

The Role of Rotary Drills

The serpentine rocks encountered usually are between three and four on Mohs' scale of hardness for minerals. This scale is not actually intended for rock hardness determination as the hardness of each mineral constituent of rock must be considered. Nevertheless the serpentine is massive in structure and for drilling investigations the rock can be considered homogeneous. It is harder than calcite but softer than apatite. The average hardness approximates that of dolomite. The chromite is granular in structure with a tendency to crumble. The rotary bits free the granules during drilling without cutting them. The chromite has a hardness factor of over five but due to the lack of cohesion between the crystals it is easily drilled.

Silicified zones in the serpentine proved an obstacle to the electric drills as the hardness factor of this ground may exceed six. Fortunately they are rare and small in extent and amount to less than one percent of the total.

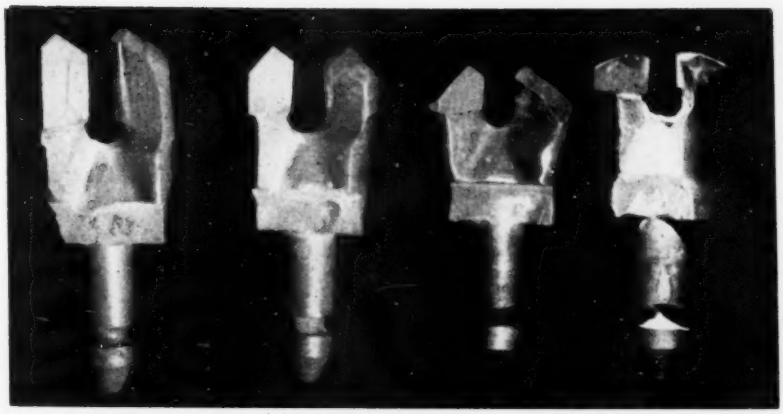
The drills have only given satisfactory results in the serpentine when the hardness factor is below 4.5. This has not proved a disadvantage as over 99 percent of the rock encountered has a hardness below 4.0. Where the hardness does exceed 4.5 the efficiency of the electric drill falls very rapidly and the Jackhammer scores. (See graph.)

Costs—Rotary vs. Percussion

For several years light Jackhammers were used to expedite underground development but their general use was never favored. The high initial outlay for these drills has weighed against them when compared with cheap African labor in ground that could be drilled by hand.

The cost of Jackhammers is over £1,000 ($2,800) per machine installed. Small installations may cost as much as £1,500 ($4,200) per machine, and great expense is usually involved in providing a water feed for wet drilling in this arid area.

Including protective switchgear and power connections from the electricity supply system the total cost of installing electric rotary machines varies from £200 to £250 ($560 to $700) per machine—a small fraction of the cost involved in comparison to Jackhammers.



From left to right: A new bit. A bit after drilling 1,100 feet. A bit after drilling 5,600 feet; note how the supporting metal has worn away from the outer edge of the tip. A bit with the supporting metal badly worn; tips are likely to chip away on their outer edge when this stage is reached.

Dry drilling is possible underground at the Umvukwe mines with electric machines.

The power required to drive an electric drill is approximately 1½ KVA which is about 1/7th of the power needed for a light Jackhammer. Power is only used by the electric machine during actual drilling.

The spare parts bill is in favor of the electric drill. Fewer parts are needed and they are simpler and cheaper.

Comparative labor costs are influenced by the hardness of the ground drilled. When the hardness is below 4.0 the electric drill gives nearly twice the drilling speed and needs only half the number of natives. No pipe fitters are required. Under such conditions the labor cost is

DRILLING EFFICIENCY IS CONTROLLED BY SEVEN FACTORS

1. *Hardness of the rock.*

When drilling in rocks with a hardness factor greater than 4.0 the drilling speed is reduced considerably. The economic limit appears to be about 4.5. In soft rocks the speed of drilling is controlled mainly by the rate at which the hole can be cleaned.

2. *Type of bit and angle of the cutting edge.*

The type of bit is very important. Experiments should be tried with various grades and designs and the results noted and compared. The angle of the cutting edge of the bit (Point angle) has an important bearing on the drilling speed and the life of the bit. Reducing the angle may improve the drilling speed but it also increases the tendency of the bit to chip and it will become blunt more readily.

3. *Condition of the bit.*

The tungsten-carbide bits remove the stone by cutting and not by grinding away. The bits must, therefore, be sharpened regularly to maintain the cutting edges. They should not be permitted to become blunt but should be resharpened when they are only dulled. The heavy torque resulting from blunt cutting edges may cause chipping and necessitate excessive regrinding. Tips should be sharpened only with the proper grinding equipment. A power operated grinder, gauge and block are necessary.

4. *Difference in diameter between the bit and the spiral drill rod.*

The difference in diameter between the bit and the spiral drill rod must be kept as small as possible, particularly in holes that are drilled downwards. The controlling factor is the tendency to jam. The difference can be made smaller in short holes, and the smaller the difference the greater the cleaning efficiency. In soft rocks high drilling speeds are obtained, but this is controlled by the cleaning efficiency of the spiral.

5. *Pitch of the spiral on the drill rod.*

The pitch of the spiral governs the rate of cleaning of the hole for any particular drilling speed of the machine (rpm.). The longer the pitch of the spiral the faster the hole will be cleaned but the sooner the spiral will tend to lose gauge. The long pitch spiral is best suited to soft ground and the short pitch to hard ground. The spiral rod used at the Umvukwe chrome mines is known as "Diamond" auger section, and it has a double spiral with a pitch of 1⅝ inches between spirals.

6. *Diameter and length of hole drilled.*

The diameter of the hole best suited to the drilling of any ground can only be determined by experiment. In holes of small diameter the drill rods have a greater tendency to jam. Small diameters are more suited to short holes.

7. *The efficiency of labor and supervision.*

On the Umvukwe mines two natives are employed on each machine. Best results are obtained by giving the drillers a task of a certain number of holes and bonus payments are made for holes drilled in excess of this figure.

A portable gasoline-driven electric generator supplies current to operate the rotary electric drill. One of the African drill operators is shown with the drill.

about a ¼ that of the pneumatic drill. In hard rock the position is very different due to the reduced drilling speed of the electric machine. The operators prefer the electric drills as there is practically no vibration and they are less tiring to operate.

This comparison refers to limited conditions and beyond these limits the electric drill has little or no application, whereas the scope of pneumatic drills covers practically every field of mining.

Labor

Prior to the adoption of the electric drills most of the drilling was done by hand, with four-pound hammers and chisel-pointed drill steel. This suited the primitive untrained African laborers particularly in the shallow outcrop zones. These surface workings are nearing exhaustion and most of the production is now from underground mining.

Until recent years African labor has been cheap and plentiful and this has retarded the application of mechanized methods. Southern Rhodesia has adopted a progressive policy of industrial development and this has resulted in a greater demand for African labor, and the need for a larger European population. Already there is not enough African labor to permit any appreciable expansion in the mining industry. In obtaining better utilization of the native labor, and provide better living standards, through increased productivity, modern mechanized methods are playing an important part.

It has been proved that two Africans operating one electric drill can replace twenty laborers doing the work by hand. The electric drills also give deeper holes and greater tonnages are being broken in stope faces. In long stopes the increased tonnage can no longer be handled efficiently with hand methods and experiments in stope mechanization are in progress.

Apart from reducing the drilling cost to less than a quarter that of hand drilling, the electric drills have freed nearly 25 percent of the underground labor for further expansion.

The Dust Hazard

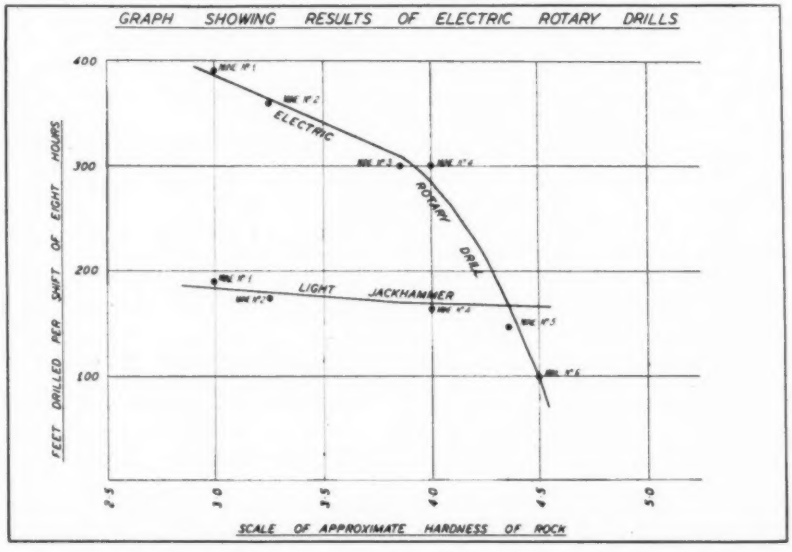
With adequate ventilation, wet drilling is not considered necessary with electric rotary machines. The bits cut relatively coarse particles and the rocks drilled in the Umvukwe chrome mines are very low in free silica. The dust conditions are usually tolerable as indicated by Konimeter tests. In a stope with through ventilation the average dust count was below 400 particles per cubic centimetre. All samples were taken on the return air side of the machine during drilling operations.

The condition of the drilling bits and the hardness of the rock affect the dustiness. A blunt bit tends to grind instead of cut and the harder the rock the greater the tendency to grind. The grinding tendency creates fine dust that may become air borne. Very fast drilling in soft ground also tends to cause dust and attention to ventilation is required if the drilling is carried out in a confined space.

Water feed to electric drills is not recommended. A suction hood over the collar of the hole and good ventilation would probably contribute more to dust suppression.

Details of the Machines

Several different manufacturers' products have been used and all have given satisfactory results. In principle they are all similar. The



chines each weigh 38 pounds and powered by motors with a rating of approximately 1.5 hp. They operate on a three phase 125 volt 50 cycle circuit. Transformers step the voltage down from the 550 volt supply. The usual transformer rating is 1.5 KVA per machine. In isolated areas that are not connected to the power supply small portable alternators are being used with success. A 7.5 hp gasoline engine drives a 1.75 KVA, 130 volt alternator which provides enough power for one machine.

The drilling machines are of robust construction and in all instances the mechanism is housed in a heavy-duty aluminum-alloy casing. They give very little trouble and if properly serviced will last for many years. Flexible toughened rubber-sheathed cables ⅝ inches in diameter, with heavy duty plugs and sockets, connect machines and transformers. Four-core cables provide a ground for the machines. It has been found from experience that the best drilling speed for Rhodesian conditions is around 700 rpm.

TABLE NO. II
Speed of Drilling in Feet per Minute

Direction of drilling	*Penetration in feet per minute*
Horizontally	1.5
Vertically downward	0.5
Vertically upward	2.0

Bits and Spiral Drill Rods

There is no doubt that much of the success attained and the economy effected in drilling has been due to attention to detail in the correct use of bits and drill rods.

The standard detachable bit has two tungsten carbide tips. The bits are supplied in sizes varying from 1¼ to 3 inches, but most of the work has been done with the 1-7/16 inch bit (36 millimetre). This bit gives a hole nearly 1¾ inches in diameter. A spiral rod 1⅜ inch in diameter is used with this bit.

Concentric bits are used. The bit points are at unequal distance from the center axis of the bit and two concentric rings are cut. One tip is slightly in advance of the other. Usually the tip cutting the other circle is 1/16 inch in advance. The point angle is also an important factor. This angle should be greater for hard drilling than for soft. The bits are supplied with either 2 mm- or 4 mm-thick tungsten-carbide tips. Nearly all the wear on the tip is on the cutting edge, and there is very little wear on either the inner face or the periphery. The 2 mm tips have given satisfactory results and it appeared that little advantage was gained by the use of the more expensive 4 mm tips. It has become apparent lately that when the supporting metal around the tip is badly worn the 2 mm tip is likely to chip on the outside edge. The 4 mm tip wears down further and gives longer drilling life. The bits with 2 mm tips cost 20/9d ($2.90) against 25/- ($3.49) for 4 mm tips (1-7/16" bits). The extra cost for the thick tips is considered justified.

The bits were originally supplied with three grades of tips: hard, medium and soft. The hard grade wears best, but is the most brittle and the most likely to chip. Bits that are badly chipped must be discarded and the working life of a hard bit may be shorter than that of a medium or soft grade. The medium grade bits wear well and are less likely to chip but require more frequent regrinding. The soft bits wear quickly but more evenly and the tendency to chip may be eliminated. They are unsuited to hard rock as they lose their cutting edge quickly but in soft ground they may prove the most economical.

In the Umvukwe chrome mines the medium grade was originally favored but new medium hard grade is proving more suitable.

TABLE NO. III
UNITED STATES IMPORTS OF SOUTHERN RHODESIAN CHROMITE, BY GRADES FROM 1946 TO 1951, IN SHORT TONS[1]

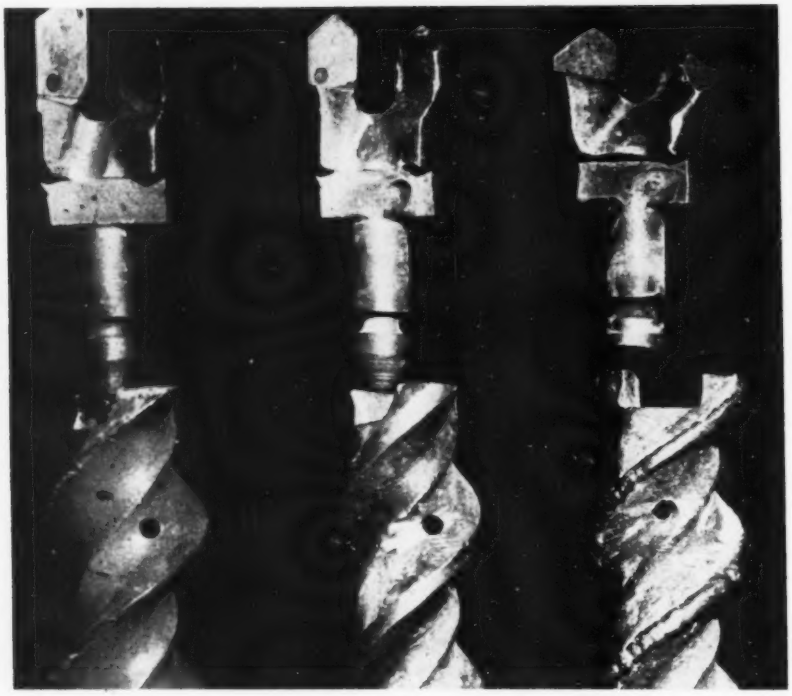
Year	*Chemical Grade*		*Metallurgical Grade*		*Refractory Grade*		*Total*	
	Tons	*Cr_2O_3 Content*	*Tons*	*Cr_2O_3 Content*	*Tons*	*Cr_2O_3 Content*	*Tons*	*Cr_2O_3 Content*
1946	11,217	4,935	72,639	34,913	15,701	7,830	99,557	47,228
1947	8,955	3,895	59,529	29,271	7,053	3,236	75,537	36 402
1948	1,117	525	108,345	51,224	16,918	7,871	126,380	59,620
1949	.....	.....	83,891	39,634	10,348	4,877	94,239	44,531
1950[2]	.....	.....	.....	.....	.....	.....	125,972	60,154

1—U. S. Bureau of Mines.
2—First Nine Months.

Life of Bits and Drill Rods

The life of a bit is dependent on the hardness of the rock. In soft rocks with a hardness between 2.0 and 3.0 the footage drilled may be as high as 7,000 feet. In medium rock where the hardness varies between 3.0 and 4.0 the life is usually from 3,000 to 5,000 feet. Above a hardness of 4.0 the life is usually below 3,000 feet and at 4.5 the bit

Mr. J. V. Mortleman, B. S., manager of the Vanad mine of the Rhodesian Vanadium Corporation watches two Africans operating the electric drill. The two men drilled 96 feet of hole in 23 minutes. An average of 4.17 feet per minute. Mortleman pioneered the development of the hard faced spiral drill rods in the Rhodesias.



LEFT: A new bit and a new spiral drill rod with no hard facing. CENTER: The same bit and rod after drilling about 1,000 feet of hole. RIGHT: The bit and rod have been worn out by 5,000 feet of drilling. The drill rod has been hard faced twice.

is unlikely to give more than 1,000 feet.

During the drilling experiments in 1948, the spiral drill rods wore out much quicker than the bits under average conditions; the spirals were considered worn out after 1,000 feet of drilling. The first 12 inches of the spiral measured from the bit usually lost 3/16 inches in gauge. Hard facing of the spiral edge was tried and the footage drilled went up to over 6,000 feet before spirals were worn out. This work was pioneered in Rhodesia by Mr. J. W. V. Mortleman, the manager of the Vanad mine.

New spirals are given 12 inches of hard facing at the bit end (Duroid, Stellite, Cobolite and Murex welding rods have all been used with much success). The welding is applied with an oxy-acetylene torch. After about 2,000 feet of drilling the spiral edge is given a second hard facing for a distance of two feet from the bit. After a further 2,000 feet they are given three feet of hard facing from the bit, and then used until they are worn down to the critical gauge. (Diameter below $1\frac{1}{8}$ inch). After this amount of work the spiral would require refacing to within about 12 inches of the shank and this is not considered economic. Beyond this stage the rod is likely to break from fatigue.

An unfaced spiral has a sharp edge that wears very rapidly at the beginning. This rapid loss in gauge meant that the spiral only worked at peak efficiency for a very short period of its life. A hard faced spiral does not lose gauge appreciably until the hard facing has worn off, so a long life and high efficiency are obtained.

Spiral drill rods are used in two popular lengths that are supplied drilled and slotted for the bits and shanked for the drilling machines. No. 1 size is four feet long and they cost 13/- ($1.82) each. No. 2 size is six feet long and cost 18/- ($2.52) each. The extent to which spirals can be hard faced is influenced by the cost of hard facing against the cost of spirals with due consideration to the increased efficiency obtained with hard faced spirals. The latter point has proved more important than the former.

TABLE NO. IV

Production of Chromite in Southern Rhodesia from 1941 Through 1949 in Metric Tons[1]

Year	*Metric Tons*
1941	322,123
1942	348,314
1943	287,453
1944	277,051
1945	186,318
1946	151,433
1947	155,149
1948	130,703
1949	243,506

1—U. S. Bureau of Mines.

Brazed Tips

Tungsten carbide tips brazed to the end of the drill rods have been used at the Vanad Mine for over a year. The operators claim that they increase the drilling speed in soft ground. Ordinary diamond-section auger drill steel $1\frac{3}{8}$ inch diameter is used. The spirals are continuous right up to the cutting edge. For soft drilling one tip is advanced about an $\frac{1}{8}$ inch ahead of the other.

Summary of Drilling Results

The degree of accuracy in drawing comparative results is limited by the many variables involved: i.e., hard or soft ground; wet or dry ground; strength of operator; difficulty of maneuvering machine in confined spaces; condition of equipment; etc. Drilling results have been taken over as long a period as possible and provide a general outline of average conditions. Data is taken from the drilling record books.

The most up-to-date figures on drilling costs are summarized in Table No. 1.

A total cost of 2d ($0.023) per foot drilled is considered conservative under average working conditions, at prices ruling in Rhodesia during October 1950.

The graph gives a summary of the results obtained at several mines and provides a guide to the possibilities of the electric rotary stone drill.

Most of the drilling in the Umvukwe mines is done in a nearly horizontal direction and the direction has an important bearing on the speed of drilling. For comparative purposes the speed of drilling under average conditions is given in Table No. 2.

The slow drilling speed when drilling downwards is due to the increased difficulty in cleaning the hole and it is important that the spiral drilling rods are kept up to gauge particularly for this type of work.

Unfortunately no accurate costs for hard facing the spiral drill rods are available yet but the average cost is assessed at 5/- ($0.70) per running foot of drill rod.

The results obtained at the Umvukwe chrome mines prove that the drill has scope in the mining or quarrying of comparatively soft rocks such as limestone, magnesite, kaolin, bauxite, clays, etc.

B. F. & H. Mining Company's openpit zinc-lead mine at the old Bull Frog and Horseshoe tracts within the city of Joplin. The Lorain P. L. 20 shovel loads a two-ton International truck. In the center foreground is the collar of an old shaft used for underground mining.

OPENPIT MINING AT JOPLIN RECOVERS ORE LEFT IN PILLARS BY UNDERGROUND MINING

The Tri-State district, long famous for its zinc and lead production, has had only one important openpit mine, the Orango Circle, at Orango, Missouri.

A new openpit lead-zinc mine at Smelter Hill, within the Joplin city limits, is attracting widespread interest in Tri-State mining circles. H. S. Smith, a former Texas mercury mine operator, is the manager of the B. F. & H. Mining Company, which has taken a long-term lease on 20 acres of the old Bull Frog and Horseshoe tracts. Both the Bull Frog and Horseshoe were underground mines operated 40 to 50 years ago to a maximum depth of 180 feet.

The new company has stripped up to 20 feet of rock and clay overburden from an area of about 10 acres, and is now mining pillars and the low-grade ore that former operators left in the backs of some of the open stopes.

Pillar Breakage

An unusual system of ore-breakage is used. A small adit is driven into the pillars, from which a series of holes are drilled, loaded and blasted. This breaks up the pillar and the upper section of the pillar caves. A 315 cubic foot Ingersoll-Rand gasoline powered air compressor furnishes air for drilling.

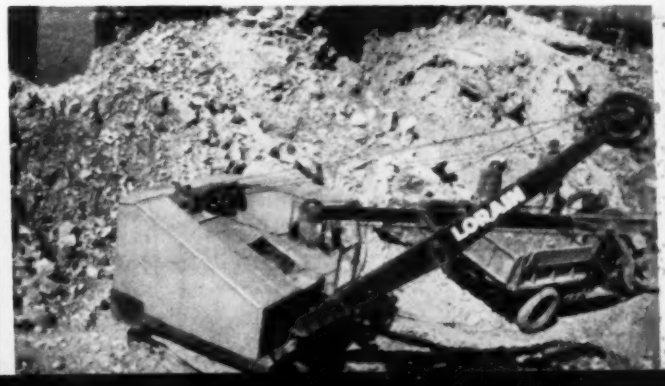
Short adit driven in old pillar. A series of holes are fanned out from this adit and blasted simultaneously to break the entire pillar.

The broken ore is loaded by a Lorrain P.L. 20 shovel, powered by a 75 hp Waukesha gasoline engine. As the ore is loaded into International one and two ton trucks, waste is sorted out and left in the pit. An Allis-Chalmers H.D. 5 tractor with bulldozer is used to clean up the pit around the shovel and pile broken ore for the shovel to load. Water is pumped from the pit by a six inch Pomona pump, driven by a 75 hp electric motor.

Lone Elm Jig Mill

Ore is trucked to the mill at Lone Elm, about two miles northwest of the openpit. This mill, managed by mill foreman W. D. Hughes and consisting of a rougher and a cleaner jig, and three tables, has a capacity of 10 tons of ore per hour. An average of 400 tons is treated each week, from which 16 tons of lead concentrate, assaying 83 to 84 percent lead, are recovered. A small amount of zinc concentrate is also produced.

Left: Shovel is used for loading broken pillar ore after overburden has been removed. At the left is an open stope part of the old underground mine. Right: Loading broken ore at the B. F. & H. openpit. Eighty to 100 tons of ore per day are mined and sorted by a crew of eight men.



LEFT: A vanishing race is the old steam locomotive. It takes good care of itself in the cold, but the operators get chilly hanging out the open windows. Diesels are rapidly replacing steamers. ABOVE: Panoramic beauty is revealed at every pit, but bulldozers and road graders work constantly to keep the roads passable. Road maintenance is a different, but not much more difficult problem in winter than in summer. Tire wear is comparable for either season; truck maintenance higher in winter.

OPERATION DEEP FREEZE

Operators on the Minnesota Iron Ranges have perfected techniques which make waste stripping feasible at temperatures as low as 50° below zero

Want a good, cold job? Try iron mining in Minnesota. It's a good job, and in the winter it's plenty cold.

Year-around-operation has become necessary for major producers on the Iron Ranges. In order to hold a trained crew, men must have a reasonably steady income; and in order to satisfy the hungry appetite of the blast furnaces of the country, a minimum of the seven to eight months annual shipping season should be frittered away stripping overburden. Production is paramount in the summer. Winters are spent preparing for it.

To say that winter in the open-pits is rugged would be the understatement of the season. Temperatures seldom get above freezing; and when they do, it is not for long periods. And, when it really cools off, the temperature sometimes plummets to 50° below zero. For men to work and operate big machines when the mercury registers 30 degrees less than it would in the ice cube compartment of your refrigerator requires considerable engineering skill.

Winter Techniques Perfected

However, winter operating techniques have been perfected to a high degree. Operations are efficient even when measured by summer standards, and men work under reasonable conditions.

Major activities in the non-producing season are stripping waste overburden and repairing and maintaining equipment. In recent years, nearly as many drills, shovels, trucks and trains have been operated in winter as in summer.

One big difficulty in winter op-

LEFT: Engineer's comfort is provided by the heated cabs of the modern diesel locomotive. This 1500-hp. unit requires little special adjustment for winter. Continuous operation prevents freezing of radiators. RIGHT: Big bites of overburden in winter are just like the 6½-yard bites of ore in summer, but dipper teeth become brittle with cold and break easily. A major problem is freezing of material to the bed of the truck.

ation is the freezing of waste material in trucks and railway cars. Moisture freezes material to the boxes immediately on contact, making it impossible to dump the contents. Several methods have been developed to prevent this freezing. Bodies have been sprayed with a salt solution. This method, relatively successful, was later improved with a solution of calcium chloride, an intensive drying agent. Experiments also are being conducted with a vegetable oil by-product, while the newest wrinkle for trucks involves using heat from their exhausts to warm the body; exhaust pipes are passed through the truck body before discharging their gases.

Very little anti-freeze is needed for trucks and locomotives. They operate all through the winter, seven days a week, 24 hours a day, and water has no chance to freeze. Adjustable shutters on radiators help control temperatures. Special cab heaters take care of operators' comfort in trucks and Diesels.

Cold Weather Problems

Cold weather raises other problems with power shovels and their equipment. These machines get intensely cold under constant exposure and steel parts are liable to crack under strain. Careful handling helps prevent such occurrences.

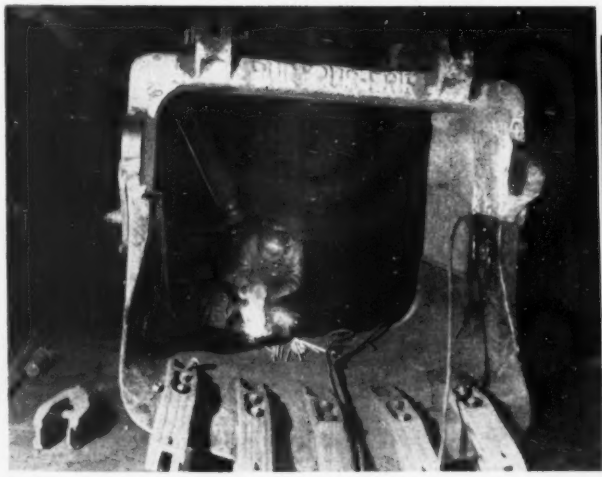
Air lines on trains and trucks sometimes freeze. This is caused by moisture condensing in the cold air, freezing and blocking off openings and valves in the line. To overcome this condition air compressors and air lines are fed a dose of alcohol which lowers the freezing point of the moisture in the compressed air. Other air-brake and cylinder compressed air is passed through de-humidifiers which remove the moisture before putting it into the system.

Despite the many difficulties of running outdoor mining operations through the dead of winter, the level of employment in Minnesota iron mines shows little difference between mid-summer and mid-winter months. Miners not employed directly in development work in the pits are transferred to maintenance shops and mills where they repair and make equipment ready for use the next shipping season.

Pictures and data were supplied through the courtesy of the Oliver Iron Mining Company.

TOP: Trucks roll without anti freeze. Twenty-four-hour operation seven days a week and use of radiator shutters prevent freezing. Operators are in a heated cab. Special heaters in the big electric-shovel cabs keep operators comfortable, but this one gets some cold fresh air. BOTTOM: A churn drill "makes hole" on the bench above while a shovel loads the blocky chunks of broken overburden below. Winter cold makes virtually no difference in the operation of the electric-powered churn drills. Drilling speed is not retarded and bit conditioning is no extra problem.

LEFT: Welding rod—tons of it—are applied during the winter months when as much major maintenance of equipment as possible is done. Dipper teeth and areas of great wear are being built up with hard surfacing. RIGHT: Power plant of the big truck is a 275-hp. diesel engine; this one gets a final adjustment after a complete rebuilding. This type of preventative maintenance eliminates a lot of costly down time during operation.



Euclid... Specialist

IN OFF-THE-HIGHWAY HAULING EQUIPMENT

Built by a pioneer manufacturer of earth moving equipment, Euclids incorporate the know-how of years of experience. Every Euclid model is engineered specifically for off-the-highway work; all of the production and service facilities of Euclid are devoted to this type of equipment.

Heavy-duty design and construction throughout assure long life and dependable performance . . . more loads per hour and more profit per load on the toughest jobs. Some of the Euclid-built features are the planetary type axle, frame and body on all models, and double-acting hydraulic hoist for Rear-Dump and Side-Dump "Eucs".

Owners can depend on Euclid's world-wide distributor organization for parts and service when and where they are needed. Call or write your Euclid Distributor for complete information on models best suited for your job requirements.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

EUCLIDS *Move the Earth*

LEFT: The Todilto limestone has been found to carry uranium mineralization in the Grants, New Mexico, area. This photograph shows a typical section cropping out along the rim of a dry wash. RIGHT: From left to right are: C. T. Griswold, mining engineer, Albuquerque, New Mexico; and J. Sheridan and Millard L. Reyner, Atomic Energy Commission geologists. They have been making a surface scintillometer survey of part of the uranium district.

SANTA FE RAILWAY COMPANY EVALUATES GRANTS, NEW MEXICO, URANIUM DEPOSITS

In July, 1950, Paddy Martinez discovered uranium-bearing limestone near Grants, Valencia County, New Mexico. Subsequent investigation proved the uranium was on land belonging to the Santa Fe Pacific Railroad Company, a subsidiary of the Atchison Topeka & Santa Fe Railway Company.

Interest in the discovery was of local nature until Santa Fe railway President Fred Gurley came from Chicago to see and check for himself what Paddy had discovered. T. O. Evans, long time mining engineer for the Santa Fe, was with him. They lost no time in realizing the potential national defense importance of the discovery as a new source of uranium. Gurley ordered Evans to sample, evaluate and report on the deposits as rapidly as possible.

"Operation Haystack"

Under the direction of Evans, Santa Fe's "Operation Haystack" (named after Haystack Mountain near the site of the original discovery) is now proceeding at a rapid rate. Some 13 uranium deposits have been discovered, extending intermittently and haphazardly over a length of 18 miles. Deposits have been found in the north one-half of Section 19, T. 13 N., R. 10 W., New Mexico Prime Meridian. This is a "Railroad" section as also are Sections 13, 17, 23, 25 and 31, on which uranium has been found. Alternate sections in the area are Indian allotment sections patented to the Navajos. While not within the boundaries of the Navajo Indian Reservation the mineral rights are under the jurisdiction of the Navajo Indian Agency. Other sections are owned by the State of New Mexico.

Rapid, Sure Exploration

A crew of 70 men is busily engaged in mapping, sampling and assaying the deposits in a 90-acre area in Section 19. A crew of engineers records and evaluates all results.

In making this rapid, large scale examination, a crew of civil engineers first maps the area and establishes a north-south, east-west grid system at 100-foot intervals. A contour map is made showing elevation of all grid intersections.

A scintillometer survey is next made of the area and all readings are recorded on a map indicating anomalies as determined by the scintillometer.

Following the surveying and mapping crew, a bulldozer is moved in to strip off the two to four feet of soil overburden. Next comes the jackhammer crew, which drills holes at every grid intersection and in the center of each 100 by 100 foot grid. All holes are drilled dry and the cuttings are collected from each two feet of hole for assaying.

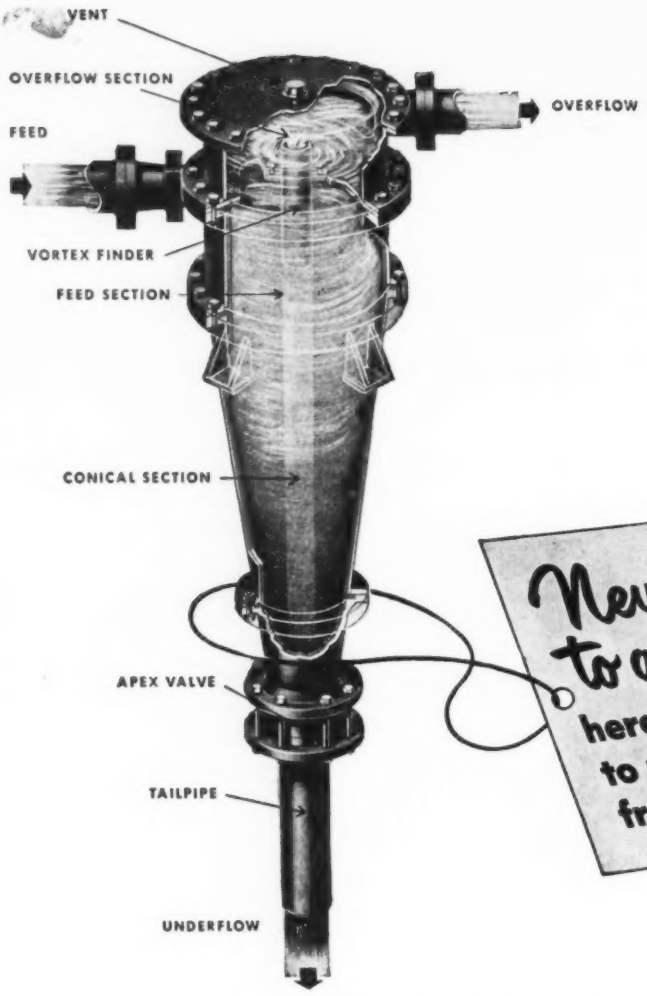
Test Pitting

Test pits 5 by 5 feet in size next are sunk to the bottom of the ore over the jackhammer hole in the center of each grid. All material from each two feet sunk in the pit is crushed to minus ¼-inch and split down to a 50-pound sample. This sample is recrushed and again split in the laboratory. Final samples from the jackhammer drilling and test pitting are assayed by radiometric equipment. Every tenth sample is sent to the U. S. Atomic Energy Commission for wet assaying. Maximum variation between the two methods of assaying has never exceeded five percent. In almost every instance the wet assay has indicated the higher value.

Geology, Mineralization

To date the uranium mineralization has been found in the Todilto limestone of Jurassic age. It underlies the Morrison formation in which the carnotite deposits of the Colorado Plateau are found. The Todilto caps the Entrada sandstone in which the Rifle, Colorado, roscoelite orebody occurs. The limestone is harder than the overlying sandstone and a large area of Todilto-capped benches or mesas has been exposed by erosion. The limestone varies in thickness from two to 25 feet. Its character and structure also vary widely within the area.

Continued on Page 56



New solution to an old problem!

here's an economical way to produce mine backfill from mill tailings...

The DorrClone* (Dutch State Mines Cyclone) is a compact classification unit employing centrifugal force in place of gravity. It provides a new solution to the old problem of support in underground openings . . . efficiently and economically. Keynote to DorrClone operation is the shearing force developed by centrifugal action. This force destroys flocculation in the feed pulp . . . results in efficient classification in the 20 micron to 150 mesh range.

DorrClones . . . can operate either as open circuit classification units or in a two-stage system depending on local conditions. In either case a clean, deslimed sand is produced. Automatic density controls insure a continuous flow of sand having the necessary percolation rate.

DorrClones . . . are extremely flexible. For example, one installation now in operation deslimes at the mill with one DorrClone—repulps the clean sand discharge to 45-50% solids and pumps it to the mine—then a second DorrClone located at the point where fill is to be placed thickens it to 68-70% solids.

Better tools TODAY to meet tomorrow's demand

Regardless of your particular mining operation, tailings composition or fill requirements, the DorrClone is an ideal tool with which to solve backfill problems. Inquiries should be addressed to The Dorr Company, Engineers, Barry Place, Stamford, Conn. or, in Canada, to The Dorr Company, Engineers, 80 Richmond Street West, Toronto 1.

*DorrClone is a trademark of The Dorr Company.

DORRCO

DORR

WORLD · WIDE RESEARCH · ENGINEERING · EQUIPMENT

THE DORR COMPANY · ENGINEERS · STAMFORD, CONN.
Associated Companies and Representatives in the principal cities of the world

PROMINENT MEN IN INTERNATIONAL MINING

ALLEN H. ENGELHARDT has arrived at La Oroya, Peru, the center of operations of Cerro de Pasco Copper Corporation, to take over his new duties as assistant manager of operations under A. R. Merz, manager of operations. Engelhardt formerly was associated for 20 years with the South American Development Company and its various subsidiaries, now terminating its operations, and rose from his first job as a shift boss to resident manager and vice president.

Raoul De Vitry of France, *Viscount Knollys* of the United Kingdom, and *Edwin T. Gibson* of the United States, members of the Central group of the International Materials Conference, have appointed *Charles Jeffers* of the U. S. as executive secretary of the Central secretariat which is being organized to coordinate the general business and meetings of the IMC committees. The IMC has been set up so that the various interested countries in the world can get together and discuss ways and means of avoiding shortages of materials, of stimulating production and of assuring distribution and use of materials. Some of the commodity committees which have been set up by the IMC, and the countries which will be represented at the meetings are the following: the Copper, Zinc and Lead Committee, with representatives from Australia, Belgium (for Benelux), Mexico, Norway, Peru, United Kingdom, United States; the Tungsten and Molybdenum Committee, with representatives from Australia, Bolivia, Brazil, Chile, Federal Republic of Germany, France, Portugal, Spain, Sweden, United Kingdom, United States; and the Manganese, Nickel and Cobalt Committee, with representatives from Belgium (for Benelux), Brazil, Canada, Cuba, Federal Republic of Germany, France, India, Norway, Union of South Africa, United Kingdom, United States. The first meetings of the committees were held last month at Washington, D.C. IMC is considering establishing further committees. Countries which are not represented may send statements to the committees anyway.

F. B. Michell, professor of Mineral Dressing at Camborne School of Mines, Cornwall, England, is visiting the United States as a member of the O.E.E.C. mission on the dressing of non-ferrous ores. He also represents Malaya, being a consulting mineral dressing engineer for a large tin producing group in that country, and he is one of MINING WORLD's correspondents.

Ivan Tevosyan, vice chairman of the Council of Ministers of the U.S.S.R., has been named minister of the Ferrous Metallurgical Industry of the U.S.S.R., and *P. F. Lomako* has a like position with the Non-Ferrous Metallurgical Industry of the U.S.S.R. These two ministries recently were created by a division of the old Ministry of the Metallurgical Industry of the U.S.S.R., into two parts. Appointment of two first deputy ministers was announced, *A. N. Kuzmin* to the Ferrous and *I. V. Arkhipov* to the Non-Ferrous branch.

W. C. Ringsleben of Toronto has been named consultant to Estella Mines, Ltd., East Kootenay district, British Columbia. He has been chief geologist for Hollinger Consolidated Gold Mines for 22 years.

V. Zachanko has been appointed manager of the Peko (Tennant Creek) Gold Mines N. L., Tennant Creek, Northern Territory, Australia. He had been with the Zinc Corporation, Ltd., at Broken Hill, New South Wales.

Sven Schwartz has been appointed chairman of the Svenska gruvforeningen (the Swedish Mining Association) succeeding *Martin Waldenstrom*. Other board members elected were, directors: *Erland Waldenstrom, Hugo Garde, Herman Henneman* and *Karl Rutberg*; managers: *Ake Bergendal, Bertil Stein, Henry Rudberg*, and *John Hedlund*; and mining engineer: *Halvar Lowenhielm*.

A. E. Ruddick, for many years assistant mill superintendent at the Chaupi concentrator of the Cia. Minera Unificada del Cerro de Potosi at Potosi, Bolivia, one of the largest tin producers in Bolivia, is retiring this month. His future address will be c/o Bank of London & South America, Ltd., 5,6,7 Tokenhouse Yard, London E.C.2, England.

Dr. John F. Thompson, president of The International Nickel Company of Canada, Ltd., was elected last month to the additional office of chairman of the board, succeeding the late *Robert C. Stanley*. *Dr. Paul D. Merica*, executive vice president and a director, was elected a member of both the executive committee and the advisory committee of the company. Headquarters of Inco are at 67 Wall St., New York.

Hilding Johansson has been appointed managing director of the Norbotten Iron Works, Sweden, succeeding *Bertil Astrom*.

A. Moline, formerly general manager of Mt. Lyell Mining and Railway Company, Ltd., Queenstown, Tasmania, Australia, has been appointed a director of the O. T. Lempriere & Company, Ltd., Sydney, smelter owners.

Louis Frenot, general secretary of the General Association of French Refiners, Moulineaux, France, recently returned there after leading a 15-man team on a five-week investigation of United States smelting and refining plants.

Sripadrao Kilpady, head of the geology department at the Nagpur, India, University, spent two weeks studying educational techniques at the Colorado School of Mines and will tour various other colleges and universities in the United States before returning to India.

Dr. M. D. Garretty has resigned his posts as manager of Zeehan Mines Pty., Ltd., Tasmania, and as chief geologist and officer in charge of exploration for North Broken Hill Pty., Ltd., Broken Hill, New South Wales. He is returning to his practice of consulting geologist at Melbourne, Australia.

M. M. O'Brien, vice president and managing director of Bralorne Mines, Ltd., has been elected president of the Mining Association of British Columbia, Canada, succeeding *Dale L. Pitt*, managing director of Silbak Premier Mines, Ltd.

Lic. Eduardo I. Aguilar is president of the National Steel and Iron Industry

LA LUZ' PERSONNEL-NICARAGUA

Part of the staff is gathered here of La Luz Mines Ltd., Siunda, Nicaragua. In the front row, left to right, are A. Schosha, machine shop foreman; O. N. Spiers, mill superintendent; Gerry McDonald, garage and shovel foreman; G. K. Carpenter, mine mechanic; George MacKay, master mechanic; Gerry Feather, Diesel plant foreman; Joe Webber, assayer; and John Plecash, assistant mine superintendent who is standing just behind John Guttridge, electrical superintendent. In the second row are Les McGarry, Tony Besich and Don Graves, mine shift bosses. In the third row are Ed Cameron, mine shift boss; H. S. McGowan, general manager; F. Badilla, assistant electrician; and C. L. Spencer, mine superintendent. Last summer completion of an expansion program at the mine put monthly milling rate up to 2,000 tons of gold ore.

Stripping output INCREASED, costs LOWERED

at English Chalk Mine

At Swanscombe in Kent County, England, 110 ft. of sandy clay is being stripped in order to reach extensive deposits of chalk. A high-speed, rubber-tired Tournapull is removing the top 50 ft. of overburden and large power shovels are digging out the bottom 60 ft.

Until a year ago, Associated Portland Cement Manufacturers, Ltd. of Swanscombe handled the preliminary stripping with a fleet of track-type tractors pulling 12-yd. scrapers. Despite 24-hour-a-day operation with these units, production was not enough to meet current mill requirements. Also, because of the great depth of overburden involved, stripping costs were very high, and any reduction that could be made would be very desirable.

After careful investigation of new equipment available, the Company, in September 1949, brought in one of the LeTourneau electric-control B Tournapulls equipped with a 30 cu. yd. capacity scraper. It was soon evident that this Big "B", working only 2 shifts, could replace 3 crawler-scraper units, working 3 shifts. For that reason, 2 Tournapull operators and the one "B" permanently took over the work of the 12-man tractor crew and three tractors.

In 12 months of continuous operation since then, the Tournapull has loaded, hauled and dumped 560,000 tons of overburden, so that there now is a sufficient supply of chalk on hand for 2½ *years* of mining. Before the Tournapull was placed on the project, reserves never exceeded a *two weeks'* supply, according to Works Manager Beal.

In 4500 hours, 99% efficient

During this entire period — 4500 working hours, in all — the big Tournapull was idle for repairs for only 24 hours. Even though the material was often water-soaked (average weight, 3000 lbs. per cu. yd.), the machine is still using its original scraper control cables. Total cost of overburden removed (including operators' wages, fuel, lubrication, and repair parts) has been reduced to only 1½¢ per ton.

Consider what similar savings of manpower and machine units, plus a similar increase in production, could mean on your job. Your LeTourneau Distributor will be glad to study your earthmoving problems and suggest a modernization program where economies can be made that will be profitable to you. Call or write today.

R. G. LeTOURNEAU, Inc.
PEORIA, ILLINOIS

MAKES 11 TRIPS PER HOUR

Checked recently on one-way hauls of ½-mi., the high-speed Tournapull was carrying heaped loads of pusher-loaded sand and clay each trip, and making 11 trips per hour. Cycle time averaged 5.3 minutes.

TRAVELS AT SPEEDS TO 19 M.P.H.

Mobile Tournapull, shown here hauling load of overburden at 19 m.p.h., drove over main highway at same speed on original 35-mile trip through London from Staines to Swanscombe.

J. J. LLANSO, formerly vice president and manager of Worthington Ltd., Buenos Aires, Argentina, has been appointed general export manager of Worthington Pump and Machinery Corporation, according to an announcement by S. R. Williams, vice president in charge of foreign business. Llanso has been with Worthington since 1929 and has spent the past 13 years in South America.

Chamber, Plaza de la Republica, No. 51, Mexico, D.F., for the year 1951. Other officers are *Enrique Ayala Medina*, vice president, and *Lic. Horacio Paredes*, treasurer.

H. D. Bevan has resigned as chief engineer of Cia. Huanchaca de Bolivia, Pulacayo, Bolivia, and, after a visit to Chile, has returned to the United States. Later he expects to work in Mexico for the San Francisco Mines of Mexico, Ltd.

L. L. van Loenen has been appointed general manager of N. V. Singkep Tin Exploitatie Maatschappij, Dabo-Singkep, Indonesia. He succeeds *A. H. de Bruyn*.

W. B. Longan recently left San Francisco, California, to spend several months in Baja California. He is directing exploration for strategic minerals there.

Edward Wisser, mining geologist, who does considerable work in Mexico and the Philippines as well as in the United States, has moved from San Francisco, California, to the Acheson Building, Berkeley, California. He has formed an association there with *Karl Schwegler*, mine operator.

Dr. W. F. James, Toronto geologist, has been made consultant for the Emerald Tungsten mine near Salmo, British Columbia, by the Dominion Government. The Government recently bought the mines from Canadian Exploration Company which, however, will continue to run the mine and mill on a fee basis.

Lynn Hersey, consulting mining engineer of Miami, Arizona, has gone to Jamaica in the Bahamas on a special mission in behalf of the British Government. The mission involves an investigation of the manganese deposits.

W. L. Dotson is working in the assay office of the New York and Honduras Rosario Mining Company. The company's property is in Honduras, Central America.

Dr. Yoshiki Ogawa, professor of metallurgy at the University of Tokyo, Japan, has returned to Tokyo after a three-month tour of metallurgical plants and mineral engineering departments of colleges and universities in the United States. He also visited aluminum plants in Washington and lead, zinc and copper mills and smelters in Utah.

Dr. P. K. Ghosh, member of the Geological Survey of India, Calcutta, has been touring United States mining centers and recently visited the Michigan and Minnesota iron ranges.

Julius Kruttschnitt, chairman of Mt. Isa Mines, Ltd., Queensland, Australia, and *D. J. Pope*, general manager of American Smelting and Refining Company, Salt Lake City, Utah, U.S.A., recently inspected the Big Bell Mines, Ltd., and other properties in which the Anglo-Westralian, Ltd., is interested.

J. R. Hylton has retired from the position of general manager of Great Boulder Gold Mines, Western Australia. *E. Elvey*, assistant manager of Lake View and Star, Ltd., has succeeded Hylton.

Frank V. C. Hewett recently was appointed director of the non-ferrous metals division of the Department of Trade and Commerce, according to an announcement by the *Hon. C. D. Howe* from Ottawa, Ontario, Canada. He is a mining engineer, director of several mines and exploration companies, and has held several government jobs.

D. A. B. Watson has become a director and deputy general manager of Johannesburg Consolidated Investment Company at London. He had been consulting engineer for the company in South Africa. At the time of his appointment the company named as consulting engineers in South Africa, *W. S. Findlay* and *I. M. Campbell Rodger*.

Sir Ernest Oppenheimer, chairman of the Anglo-American Corporation, has resigned from the board of directors of many associated companies in the group on account of his age and a desire for a less strenuous business life. The companies from which Sir Ernest has resigned are the Daggafontein Springs and Brakpan mines on the East Witwatersrand; Welkom, President Brand and President Steyn in the Orange Free State; Rand Selection Corporation and South African Land and Exploration Company.

INTERNATIONAL NEWS

ECA Assisting Iron Ore Exploration in Norway

About 300,000,000 tons of low grade iron ore are thought to exist in the Dunderland field, northwestern Norway, near the Arctic port of Mo-i-Rana. Iron ore has not been produced from the deposits since 1939, but recently systematic exploration has been under way, including 60,000 feet of diamond drill holes. The results indicate enough reserves of iron ore to provide sufficient quantities for Norwegian consumption as well as for export. However, as the deposits are low grade, the only economical way of extracting it is by very large scale mining.

Under the Marshall Plan, the Economic Administration will finance the cost of up to $120,000 worth of drilling equipment and pilot plant machinery needed to carry on further research to see if the ore can be economically concentrated, and if there are sufficient reserves for long operation so that the expense of plant construction is justified.

Rana Gruber A/S, a company owned by both the Norwegian Government and the Sydvaranger Iron Ore Company, is doing the exploration, the total cost of which will be about $660,000.

Wah Chang to Mine & Mill Western U. S. Tungsten

The Wah Chang Corporation, one of the world's largest tungsten buyers and processors, has formed the Black Rock Mining Corporation, which maintains its headquarters at 207 Clarke Street, Bishop, Inyo County, to handle mining, milling and procurement of tungsten ores and concentrates from the western United States. The new company has bought the Northumberland mill near Tonopah, Nevada, will move it to the Bishop area, and will increase its capacity to 750 tons per day.

The mines from which the company will obtain ore include the following: the Black Rock tungsten mine, which is 34 miles north of Bishop, west of U. S. Highway 6, is under lease from the Tungsten Corporation (which is shipping 300 tons of tungsten ore daily to the U. S. Vanadium Company's mill near Pine Creek, and is an openpit mine but will also be developed underground; the Round Valley tungsten mine, also under lease, where development is under way; the Scheelore mine in McGee Creek Canyon, leased from H. A. Van Loon, Joe E. Riley and Emil Morhardt, and about ready for development; and the Lincoln mine in Lincoln County, Nevada, under lease and to be developed. Several other properties are being considered and the company is interested in hearing of possible prospects.

Officers of Black Rock are K. C. Li of New York, president (he also is chairman of the Wah Chang Corporation's board of directors); Carl M. Dice and T. S. Moran, both of New York and both vice presidents; J. H. Hirst of New York, secretary; Clarence H. Hall of Bishop, treasurer and manager; Otis Kittle, formerly of Round Valley tungsten mine, mining engineer; James C. Esola, Black Rock mine superintendent; J. D. Hill, office manager; and W. F. Elgin, Lincoln mine superintendent.

Barvue Plans 4000-Ton Zinc Mine and Mill

Barvue Mines, as a result of diamond-drill exploration on its holding in Barraute Township, Quebec, has drawn plans for a 4000-ton flotation mill to concentrate zinc ores from an orebody estimated to contain 10,500,000 tons of ore above 700 feet of depth.

The mining operation will consist of open pitting in center areas and underground mining in peripheral zones.

Andrew Robertson, manager of Golden Manitou Mines, Ltd., which owns Barvue Mines, reports that flotation tests indicate a recovery greater than 90 percent on the sphalerite ore; ore averages slightly over three percent in zinc content; and that the concentrates produced by the tests were clean of penalties and contained 60 percent zinc. Plans call for shipment of concentrates to East St. Louis for smelting.

Barvue has purchased the old Uchi mill building and is wrecking it for use in construction of the new mill. Negotiations are now in progress with Quebec Hydro to supply electrical power to the operation, and a survey is now being made to bring a spur rail line in to Barvue from the C.N.R. main line.

Reynolds Will Construct Texas Aluminum Plant

Richard Reynolds, Jr., president of Reynolds Metals Company of Richmond, Virginia, announced that his company will build an $80,000,000 aluminum reduction plant in the Corpus Christi, Texas, area and it will have the capacity to produce 150,000,000 pounds of aluminum pig annually. Operation is expected by the end of the year, and about 600 people will be employed.

An electric power plant will be constructed in conjunction with the aluminum operation and will have the capacity to generate 175,000 kilowatts of power, using Diesel engines energized by natural gas.

The aluminum reduction facility will be housed in four potline buildings each 1,600 feet long. In addition there will be several buildings including a carbon plant to produce carbon required for the operation. The Soderberg process will be used.

Alumina will be shipped to Texas from the company's plant at Hurricane Creek, Arkansas, but eventually an alumina plant with a capacity of 1,000 tons daily will be built near the Corpus Christi reduction plant. Bauxite will be supplied from Jamaica where Reynolds has extensive reserves.

Nepalese Zinc Deposits Will Be Developed

A 20,000,000-rupees scheme for the development of zinc deposits in the Kingdom of Nepal, on India's northeastern border, is to commence in May, when 25 geologists start prospecting in the hills of Tiplin, 10 miles northeast of Khatmandu, the capital of Nepal. The project will be undertaken, political conditions permitting, by the Himalayan Syndicate in partnership with the well-known Tata Corporation of India. The syndicate proposes to subscribe 51 percent of the share capital necessary for the venture and will provide Rs. 300,000 immediately for the prospecting.

A preliminary survey conducted by the Nepal Government Bureau of Mines has indicated the existence of a good grade of ore in an area of 20 square miles near Tiplin. The present plans of the partners, when operations get under way, are to convey the ore by an aerial tramway from the mines to a processing plant in Nepal, and then to ship the concentrates from Nepal to a smelter to be set up by Tata in India for final treatment.

The companies expect the project to take three years, and, when finished, to supply India with enough zinc for its own needs with a sizable surplus for export.

Vanadium Corp. Acquires African Chrome Mines

The Vanadium Corporation of America will more than double its production of metallurgical chrome ore as a result of the recent purchase by its subsidiary, Rhodesian Vanadium Corporation, of properties in Southern Rhodesia, where the company has operated since 1926, according to William C. Keeley, president of VCA.

The new acquisition will provide all of VCA's chrome ore requirements. The properties were purchased as a "going concern" with complete equipment, including mine cars, rails, dumps, water supplies, and housing facilities for the native labor force of approximately 600. VCA will operate all of its Southern Rhodesia chrome ore properties through a colonial organization.

Mr. Keeley announced also that the company has made an agreement with Societe d'Electro-Chimie of France for the use of the latter's process for the manufacture of very low carbon ferrochrome, which is utilized in the production of newly developed types of alloy steels of low carbon content. Production by this process is scheduled to begin later this year at the Niagara Falls, New York, plant at which approximately $1,500,000 is being spent to increase facilities.

OCEANIA

QUEENSLAND—The directors of *Tableland Tin Dredging N. L.* are negotiating to obtain the *Smiths Creek* area. The dredging company's *Return Creek* property has been nearly exhausted of reserves.

TASMANIA—*Zeehan Mines Pty., Ltd.*, has intersected the Oceana orebody on the 300-foot level and has penetrated five and a half feet in average grade ore.

MAKATEA ISLAND—Phosphate mining in 1950 on Makatea, one of the French Society Islands, resulted in the production of 340,000 tons of wet phosphate. Export tonnage was 300,000 tons in dry phosphate.

WEST AUSTRALIA—*Phoenix Mine* resumed sinking of the Regent shaft to 2,764 feet. A north and a south drive from the No. 6040 winze, just begun, show good values, 15.1 dwts. over 77 inches and 31.5 dwts. over 48 inches, respectively, according to reports.

NEW GUINEA—A net profit of £4,903 for the year ended September 30th, 1950, is reported by *New Guinea Goldfields, Ltd.* The year before the company lost £33,610. The Golden Ridges lode mill is expected to be in operation in a few months. Alluvial operations counted for most of the company's revenue.

QUEENSLAND—Exploration is being carried on at Cloncurry by the Bureau of Mineral Resources and at Pinevale near Mirani by a group of men who may form a public company if present work appears sufficiently encouraging. The Bureau is examining geological structures in the copper and lead-zinc fields. The other group is sampling copper ore showings.

TASMANIA—*Mt. Lyell Mining & Railway Company, Ltd.*, at Queenstown, reports improved ore tonnage as a result of a carefully planned mining program. Slightly better grade ore is being extracted, and several large, new Euclid trucks have been of great assistance. Further development of the West Lyell opencut is under way, and increases in output are to be expected. The recent increase in copper prices should help this company considerably, as a very lowgrade ore is treated. Ore is milled, flotation concentrates are blast-furnace smelted, and the blister copper electro-refined, then shipped to the *Electrolytic Refining and Smelting Company* at Port Kembla, New South Wales, for conversion to market shapes.

WEST AUSTRALIA—A flat reef has been intersected by *Central Norseman Gold Corporation N. L.* at 403 feet, showing free gold. Samples assayed 10 ounces over 72 inches. The reef was exposed in the sinking of the Princess Royal shaft.

NORTHERN TERRITORY—From Tennant Creek, *Noble's Nob Mine* reports a recovery of 2,513 ounces of gold from 1,210 tons milled in the month ended December 13, 1950. *Peko (Tennant Creek) Gold Mines, N. L.* reports that diamond drilling is in progress at its property.

PHILIPPINES—During the month of January, 1951, *Mindanao Mother Lode Mines, Inc.*, handled 11,200 tons of ore for a recovery of $208,026 (U.S.) compared with 9,500 tons for $177,897 in the previous year.

ASIA

CHINA—A good year, mineral-wise, is expected in Kweichow Province during 1951. Production of manganese ore from the Tsenyi district and shipments of ferro-manganese to other provinces will continue. Mercury production from the mines of Tungzen and other districts will be increased. Antimony mines will be developed in the Doshan district, and lead and zinc prospects will be explored and developed in the Haitzan district.

INDIA—Under the Atomic Energy Act, uranium or uranium-bearing minerals cannot be exported from India. The government, after a careful study, has now decided to purchase all stocks of uranium available from dealers or mine owners. With regard to uranium-bearing minerals, ore and concentrates, those acceptable should normally contain a minimum uranium content of 10 percent by weight of uranium oxide. The price to be paid will be based on the uranium content at a minimum rate of Rs. 9/- per pound f.o.b. station of dispatch. This rate is guaranteed for a period of five years. If the ores or concentrates contain any other rare minerals, such as columbium and cerium, consideration will be given for additional payment. A few months ago the government announced rewards for discoveries of uranium ore. This step has been taken to encourage prospecting and mining of strategic minerals.

PAKISTAN—Gypsum production in the first six months of 1950 was 9,422 tons. In 1949 total production amounted to 15,645 tons. The principal miners of gypsum in Pakistan are the *Associated Cement Company, Ltd.*, and Mohammad Yusuf Khabar Khan of the Kotri district in Sind.

MALAYA—The rocketing price of tin is leading to the reopening of some marginal tin mines and the extension of activity by those already in production. During February, tin price fluctuated between £1,350 and £1,630 a ton. The effect of this rise from £600 last June on low cost producers like *Gopeng Consolidated, Ltd.*, is startling. Costs per ton of tin up to September, 1949, was only £103. Last year Gopeng produced 828 tons of

KING ISLAND SCHEELITE SIGNS LONG-TERM TUNGSTEN CONTRACT

Pictured here is the milling plant of King Island Scheelite, (1947) Ltd. on King Island in Bass Strait, between the island of Tasmania and Melbourne, Australia. From left to right are the thickener, mill building, fine-ore bin, secondary crusher building and top of the primary crusher building. About 500 tons of 0.6 percent WO_3 (scheelite) ore is treated per day. The ore is mined from a large openpit which is completely mechanized with Diesel shovels, trucks, and bulldozers. A. R. Bruhn, managing director of King Island Scheelite, has been in the United States where he discussed the contract under which sale of concentrate to the United States government will be made for a seven-year period. A separate contract provides sale of concentrate to the British government for five years. Value of the concentrate covered by the contracts has been reported as $15,680,000 pounds (£A7,000,000). As a result of these contracts a large development program is planned at the mine, and output will be substantially increased.

tin from its Kinta district property; this year it is expected to increase this amount by up to 100 tons. The first interim dividend for 1950-51 has been trebled at 15 percent and earnings should be running at more than double the 1948-49 rate of 37 percent. The Malayan income tax increase from 20 to 30 percent will somewhat offset the new prices, however. *Pacific Tin Consolidated Corporation* has reported that the adjusted tax cost it $78,000 of its profits.

PAKISTAN—Output from Pakistan's high-grade chromite deposits during the first six months of 1950 was 9,000 tons against a total production of 15,673 tons and 17,873 tons in 1949 and 1948, respectively. Until the end of 1949 the *Baluchistan Chrome Company* was the principal chrome mining firm in Pakistan. In the last six months, however, *Pakistan Industries, Ltd.*, has become interested in chrome development and has been granted a number of prospecting licenses.

TURKEY—Chromium occurrences have been discovered in the Iskerdun district and will be mined. Output from the discovery combined with that from existing mines should raise Turkish production to 800,000 tons yearly.

INDO-CHINA—Production of tin concentrates in 1950 was 70 tons, produced by native workers in Laos. Because of the insecure conditions in the country reconstruction of damaged buildings is almost completely at a standstill. Before the war about 3,000 tons of tin were extracted yearly.

EUROPE

ENGLAND—In Derbyshire, *Constables (Matlock Quarries) Ltd.* continues to operate its Masson fluorspar mine as an openpit and is enlarging the dressing plant by the addition of flotation equipment. Lead is being produced as a by-product. The company also is reopening the Oxclose shaft for lead and fluorspar.

ITALY—During the first nine months of 1950 Italy produced 1,325 tons of quicksilver against 1,107 during the same period of 1949. Exports amounted to 254 tons against 193.

HUNGARY—In the Matra Mountains the Hungarian Government Department of Mines, which has just been created with the object of increasing the mining output in Hungary, has discovered iron ore deposits amounting to 20,000,000 tons. The government has made an allocation of 50,000,000 florints to start exploitation of the deposits.

ALBANIA—Torbernite-bearing structures have been discovered by officers of the Russian Mission in Albania in the vicinity of Albania's Lake Ochrida. The exploitation of this uranium-bearing ore is to be taken over by a Russian mining group which will arrive shortly at Valona.

YUGOSLAVIA—The Yugoslav government is negotiating the purchase of mining equipment and machinery in western Germany. Yugoslavia will supply iron and copper ores to the German metal industry in return.

AUSTRIA—The *Alpine Montan Company*, which is expanding its Donawitz steel works, has ordered a blooming mill and accessory machinery from the Lewis Foundry and Machine Division of the Blaw-Knox Company at Pittsburgh, Pennsylvania, U.S.A. The cost to the steel company will be $1,000,000.

ENGLAND—The *Hemerdon* wolfram mine near Plymouth may be reopened by the Ministry of Supply. During World War II a 1000-ton-daily plant consisting of jigs and tables was erected to recover wolframite and some tin from the large lowgrade deposits in the area. One or two other very small tin or wolfram mines have been reopened in western England, but none of great consequence.

SWEDEN—At Guliksberg, near Anund Lake, Swedish Lapland, a large deposit containing uranium, silver, copper, zinc and magnetic pyrites has been found. Preliminary surveys established the orebody's length at 1,900 feet and its width at 1,000 feet. Sweden has been obtaining uranium from oil shales at Kvarntorp, so the discovery is of particular importance.

SPAIN—A new gold treatment plant is being installed to replace the old mill at the Cerro of San Cinto gold mines, Rodalquilar (Almeria). The mines in this district have produced a total to date of 1,000,000 tons of gold ore.

ENGLAND—The great British iron and steel industry, the second largest in the world and the second cheapest producer of many varieties (Australia is the cheapest) passed under the control of the government on February 15th after a last minute struggle in Parliament, which only gave the government a majority of ten votes in 606. The Iron and Steel Corporation which will now run the industry consists of men who have a lack of any practical experience in steel making. The chairman of the new corporation, Mr. Steven Hardie, asked steel men to forget politics and help him run the industry successfully. He says that the new capital plans for the industry involve the spending of £500,000,000 during the next five years. The 180 firms for which the government has paid £239,000,000 compensation, will continue under their present identities. British steel production is expected to decline this year from its present record level of 16,500,000 tons a year due to shortages of raw materials and scrap.

ITALY—The *Societa Miniere dell 'Alto Cadore*, Venice, is planning exploitation of mica deposits discovered in the Dolomite region near Cortina d'Ampezzo. The company has a capital of 250,000,000 lire.

SPAIN—The *Compania Minero y Metalurgica Penarroya* will develop and mine the complex lead ores of the Manta de los Azules in the Sierra de Cartagena. Reserves on the property are estimated at several million tons with an average lead content of 1.80 percent. The company expects first to drive a two kilometer tunnel; ore will be transported to the differential flotation mill at Portman on the shores of the Mediterranean.

SWEDEN—The Board of Trade has proposed to the Riksdag (Diet) that operations be started in the state-owned *Rudtjebak* mine at Mala, northern Sweden. According to estimates by the Swedish Geological Research Society, the deposits contain 3,300,000 tons of ore containing 41.9 percent sulphur, 1.0 percent copper, and 4.25 percent zinc.

YUGOSLAVIA—Iron ore resources have been discovered in the zone of Ogulin north of Rjeka (Fiume) by prospectors of the Yugoslav government, but in what estimated quantity has not been stated. However, an official statement of the Belgrade Ministry of Industry confirms the discovery and the fact that the deposits are to be exploited by the Yugoslav iron and steel industry.

SICILY—French mining companies have offered their technical and financial assistance to the Italian government to reorganize the Sicilian mining industry, provided that they are assured majority control of exploitation. France has just purchased 60,000 tons of Sicilian sulphur to be delivered during 1951 compared with 26,000 tons purchased in 1950.

Save Money Screening

Fine to Medium-Coarse Materials

AERO-VIBE SCREEN

CHECK THESE FEATURES

- Vibrating mechanism is self-contained unit located above mechanism.
- Vibration adjustable by merely altering circular position of outer counterweights at end of shaft.
- Easy to remove vibrating mechanism — remove only eight bolts.
- True running drive — screen sheave does not vibrate with screen.
- Sizes 2 x 4 to 5 x 10 ft. Open or enclosed. 1 to 3 decks.

LOW FIRST COST plus low operating costs — no wonder mining men have found this vibrating screen profitable for screening or rinsing a variety of ores.

Simple two-bearing Allis-Chalmers design has fewer parts, resulting in easy maintenance and low power costs. *Aero-Vibe* screens are built sturdily — they deliver a top-notch job of screening year after year despite tough-going service.

The Allis-Chalmers representative in your area will be glad to show you how *Aero-Vibe* screens can fit into your operations. Call him, or write for **Bulletin 07B6099.** A-3176

Allis-Chalmers
Milwaukee 1, Wis.

ALLIS-CHALMERS

Aero-Vibe and Texrope are Allis-Chalmers trademarks.

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.


Motors


Controls


Texrope Drives


Vibrating Screens


Crushers


Kilns, Coolers, Dryers

ITALY—In its program to develop national raw materials, the Italian government will allocate 20,000,000,000 lire to carry out extensive mining research. Part of this work has begun, particularly in northern Italy, where uranium minerals have been found in the province of Trento in the Fersina River valley. Uranium also has been discovered in the province of Cuneo near Lurisia and in the Pesio valley. Two exploration and development permits have been issued already to the *Montecatini Mining Company* and to the *Societa Italiana dell-'Uranio*, both with headquarters at Milan. The deposits contain autunite and torbernite, mainly, and drilling to the depth of 2,000 meters will be necessary to reach the most important torbernite-bearing structures, according to the government mining department.

FRANCE—The Lorraine district's 15 steel plants have expanded greatly in the past two years and considerable Economic Cooperation Administration funds have gone into them. There are now nine new rolling mills; and, of 75 operating blast furnaces, 25 had been rebuilt with capacity increased by the end of 1950. The district's 54 iron ore mines, which produce five-sevenths of France's ore, are being modernized with the aid of $4,000,000 in direct ECA aid.

ENGLAND—A fluorspar deposit has been discovered at Lathskilldale, near Youlgrave. A private company has begun exploitation.

NORWAY—Molybdenum mining has been resumed at Knaben by the *Knaben Molybdengruber A/S*, and the present staff of 100 miners is being increased. Before the last war about 400 men worked the mines, but since the shutdown only a small amount of prospecting has been done.

SOUTHWEST AFRICA—A new company, *Namaqualand Copper, Exploration and Mining Company, Ltd.*, has been registered and has acquired options to purchase up to 88,700 acres in Namaqualand, in addition to about 4,000 base metal claims in the same area. Preliminary sampling has revealed encouraging values in copper.

SOUTHERN RHODESIA—About 500,000 tons of chrome ore, worth about $20,000,000, are lying in stockpiles in Southern Rhodesia awaiting shipment to the United States. *Rhodesia Chrome Mines*, which has by far the biggest stockpile, states that about 400,000 tons are stockpiled in Selukwe alone. These mines are producing at the rate of about 15,000 tons of chrome ore per month. *Africa Chrome Mines* also has large stockpiles.

SOUTH AFRICA—The iron ore deposits at Airlie in the Eastern Transvaal, estimated to contain 120,000,000 tons, will be exploited by the *Dominion Iron & Steel Corporation, Ltd.*, a new company. It will produce pig iron by means of the Krupp-Renn process, which treats low grade iron ore and titaniferous iron ores and which can use low grade coal instead of coke. Fried. Krupp of Essen will erect the plant. Airlie is on the main Johannesburg-Lourenco-Marques line.

BELGIAN CONGO—Tin, columbium and tantalum ores will be mined by the *Societe Miniere de Nyangwe* in the Kabambare territory south of Kivu. The company has the concession until 1980.

MADAGASCAR—The Syndicat du Mica de Madagascar, which handles the 600-ton per year mica output in Madagascar, has signed a contract for delivery to the United States of 150 tons of phlogopite mica, costing $220,000.

GOLD COAST—*Bremang Gold Dredging Company*, through negotiations with the *Gold Coast Selection Trust*, has acquired the rights to alluvial areas owned by the Trust along the Offin and Jimi Rivers. The areas are estimated to contain 175,000,000 cubic yards of alluvial deposits averaging 2.63 grains per cubic yard, i.e., 872,600 ounces of fine gold. Breman has four dredges at work about 25 miles southwest of the Offin River, and one of these is being dismantled for transportation to the new ground. In the quarter ended December 31, Bremang treated 2,388,300 cubic yards of gravel and recovered 10,725 ounces of gold.

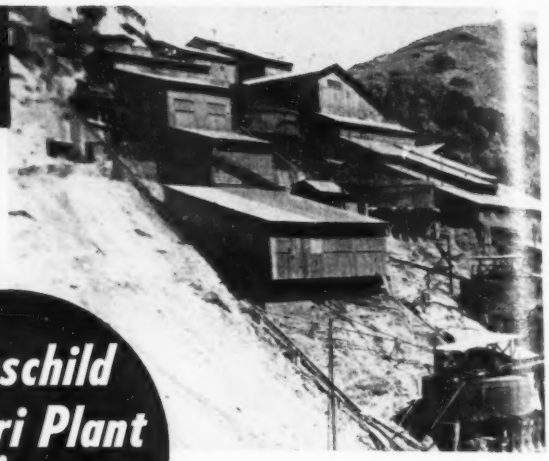
SOUTH AFRICA—One of South Africa's most irritating economic problems is shortage of power. To repair this, the South African Electricity Commission, which recently ordered a 10 percent power saving in the Union, will spend £54,000,000 on an expansion program during the next two or three years. In the Transvaal and Free State, where huge, unsatisfied demands for power exist, new power stations will be built at Vierfontein and Taaibos. The capacity of the Vaal station will be doubled by January, 1953. The £20,000,000 station planned for Taaibos will have the largest generators, boilers, transformers and switchgear of any power station in the Union. Four 60,000 kw sets should be in operation within four years. Together with its Rand capacity, this project will make "Escom" one of the greatest concentrations of power supply in the world and is good news for the gold mining companies worried by power shortages as their mines come into production in the Orange Free State.

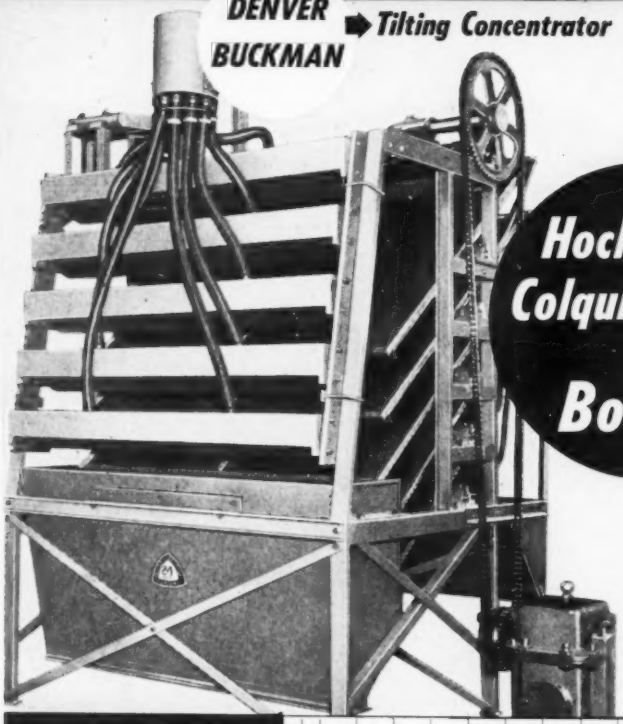
SOUTHERN RHODESIA—For the six months ended December 31, 1950, *Roan Antelope Copper Mines, Ltd.*, produced 36,348 long tons of blister copper. Estimated profit (before providing for taxation) was £2,695,000.

FRENCH EQUATORIAL AFRICA—*S. E. C. A.*, which has already granted loans to the *Cie. Miniére de l'Oubangui Oriental* and to the *Societé de Recherches et d'Exploitations Diamantiféres* to increase their diamond production, will grant a loan of 140,000,000 francs to the *Cia. Dia-*

Recover Tin, Tungsten and other high Specific Gravity minerals in —200 mesh range at low cost with—

DENVER BUCKMAN ➡ Tilting Concentrator





Hochschild Colquiri Plant in Bolivia recovers 15 tons per month at a cost of only 7c per ton milled

(Quoted from November 1950 Mining Engineering)

"The tests reported in this paper indicated a tin recovery of 42 pct. The actual plant results for 1949 show a 54 pct. tin recovery from the Sullivan (Denver-Buckman) decks.

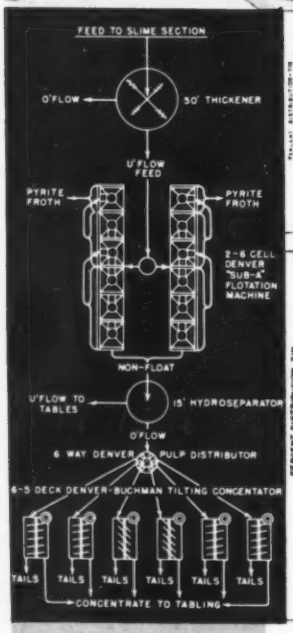
"The total average quantity of tin produced from the S deck section in 1949 was 15 tons of tin per month. This corresponds to 3 pct. of the total mill recovery.

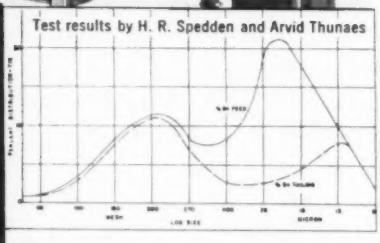
"The operation of the whole slime plant in Colquiri including flotation and fine sand tailing, cost $0.07 per ton milled.

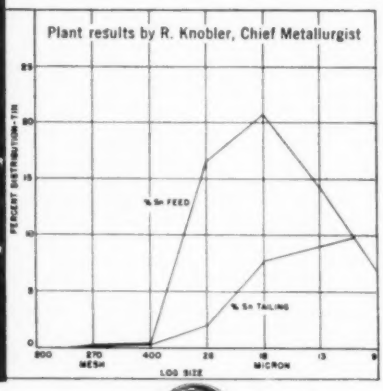
"In the vear 1949 only $317.00 was spent for spare parts and material for the Sullivan decks in Colquiri with a total of 268,600 tons milled."

Because of its ease of operation, The Denver-Buckman Tilting Concentrator is far superior to any known type of machine for recovery of cassiterite and other high specific gravity materials in fine sizes.

Denver-Buckman Concentrators are available in half sizes for laboratory pilot plant work, or the testing can be done by Denver Equipment Company Ore Testing Division on a cost basis.







FLOTATION ENGINEERS

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

WRITE TODAY FOR DETAILED INFORMATION

"The firm that makes its friends happier, healthier and wealthier"

DENVER • NEW YORK • CHICAGO • EL PASO • VANCOUVER • TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG

DENVER EQUIPMENT COMPANY, 1404 17th St., Denver 17, Colorado

...ntifère et Aurifère de la Haute Sangha for a prospecting project.

SOUTH AFRICA—In January, 1951, Transvaal gold production reached the following figures: Tons milled, 4,857,100; yield, 954,791 ounces of fine gold; working revenue, £11,381,243; working costs, £7,399,929; and estimated working profit, £3,981,314. Working costs were down one penny from the December figure because of increased output, even though the grade of ore milled was somewhat lower.

SOUTH AFRICA—Figures on labor for the entire year of 1950 are as follows: The fatality rate was the lowest on record, namely, 1.33 per 1,000, against 1.48 in 1949, and 1.46 in 1938. The previous record was in 1947 at 1.37 per 1,000. An average of 40,968 whites and 295,943 colored were employed per month at the large gold mines of the Witwatersrand and its extensions; and at the large mines in other Transvaal areas, 592 whites and 6,717 colored were employed. In the Free State, the large gold mines employed an average of 2,852 whites and 16,040 colored per month.

TANGANYIKA—The *Geita Gold Mining Company, Ltd.*, in the year to June 1950, milled 174,748 tons, against 153,400 in the previous year, with a respective recovery of 30,524 and 28,038 ounces of fine gold. As of June 30th, estimated ore reserves were 2,280,456 tons averaging 3.8 dwts. per ton against the previous figures of 1,612,684 tons and 3.9 dwts. Mill extensions were brought into commission on October 18th and, with the reconditioning of the old plant, capacity was raised to 30,000 tons per month.

SIERRA LEONE—In the third quarter of 1950, the country produced 1,019.31 troy ounces of crude and unrefined gold bullion with an estimated content of 920.27 ounces of fine gold. In 1949 the figures were 894.98 and 851.82, respectively. Iron ore production amounted to 332,080 tons, nearly 16,000 tons more than in 1949. Diamonds figured at 122,312.60 carats; and chromite at 1,576 tons, both up from 1949.

SOUTH AFRICA—The *Kennecott Copper Corporation* of New York has acquired further interests in the Orange Free State gold fields by negotiating a 33.86 interest in the *Merriespruit (Orange Free State) Gold Mining Company, Ltd.*, through the *Middle Witwatersrand (Western Areas), Ltd.*, organizer of Merriespruit. Kennecott already has an interest in the *Virginia Orange Free State Gold Mining Company* and total investments in the two companies are now $13,204,751. As far as Kennecott's copper operations are concerned, it produced 1,152,065,960 pounds of copper from its U.S. and Chilean mines in 1950.

LATIN AMERICA

VENEZUELA—The Venezuelan government, through its agency, the *Corporacion Venezolana de Fomento*, will build a steel plant at a site by the junction of the Caroni River and the Orinoco, near the *El Pao* iron mines of *Iron Mines Company of Venezuela*. Studies have been under way for two years to determine feasibility of the plant and methods of ore reduction. The plan is now to build the plant with a yearly output of 70,000 tons, eventually to rise to 2,000,000 tons. The entire project will cost the government about 400,000,000 bolivares (around $120,000,000), since included in the plans are the dredging of the Orinoco River to allow passage of ocean-going vessels; the erection of a large hydroelectric power plant at Caroni Falls; and the laying of a pipe to carry natural gas from the eastern oil wells to the steel plant.

MEXICO—A large iron deposit, samples from which are said to have assayed high grade, was reportedly discovered in the Cerros de Zomelahuaca, 20 miles west of Jalapa, the Vera Cruz capital, by Erasto Cruz, a gambusino. The Institute for the Investigation of Mineral Resources is checking the deposit.

COLOMBIA—Emerald mining will begin soon at the *Muzo* and *Coscuez* mines by the Bank of the Republic. They will be cut at Bogota for sale abroad or locally.

BRAZIL—The most important nickel deposits found in Brazil are those around Niquelandia Township in the state of Goias, especially since the nickel in this region is found in association with copper, which is scarce in Brazil. According to Alberto Erichsen, head of the country's Division of Mineral Production Development, the available water in the region for electric energy would make exploitation of the deposits economically feasible. Most of the rest of Brazil's nickel has been found in the state of Minas Gerais at Liberdale, Santa Cruz, and Santa Maria.

MEXICO—The *Santa Maria de la Paz y Anexes en Matehuala*, S. A., has bought a new SEH-8 Diesel engine with a 1000 kw electric machinery generator for its 100-year-old Negociacion Minira lead and gold mines. The generator, brought from the newly formed Worthington de Mexico, subsidiary of the U. S. firm, Worthington Pump and Machinery Corporation, has been installed near the *Catorce* mine at Villa de la Paz, S.L.P., about 20 kilometers from Matehuala.

New POWER FEEDS for Thor DRIFTERS

SENSITIVE CONTROL...

√ Fast feeds, slow feeds (as slow as 2 inches per minute!) rapid return and advance, all controlled from one infinitely variable throttle for top performance under all conditions.

√ Carbide bit breakage virtually eliminated... even inexperienced drill runners can hold bit against bottom at correct feeding pressure to eliminate bouncing, hard vibration, bit breakage.

AMAZING POWER

On the job demonstrations of new Thor Power Feeds now being arranged! See how these powerful, precision controlled drive units can *save you money* — EXTRA FOOTAGE, LESS MAINTENANCE, FEWER STUCK STEELS, ALMOST COMPLETE ELIMINATION OF BROKEN BITS.

For use with powerful No. 82 and 92 Thor Drifters, new Power Feeds are available in three sliding cone shell lengths—24"x24"; 30"x30"; and in a new stress-proof aluminum shell, 48"x48", weighing actually less than the 30"x30" in steel!

Thor's tremendous advances in Drifting technique are worth investigating—write or wire for a Thor service engineer today! Independent Pneumatic Tool Co., Aurora, Ill.

NEW THOR TOOLS SPEED DRIFTING

AIR BAR FEEDS—for converting hand-feed drifters, and sinkers, to power feed. Simple, efficient.

SINKER LEGS—new "clamp-on" air feed leg permits sinkers to do double duty—drilling down holes and drifting. Standard or reverse feed.

PNEUMATIC COLUMNS—simplify drifter set-ups. Safety features prevent accidental collapse.

Thor PORTABLE POWER TOOLS

ELECTRIC • PNEUMATIC

INTERNATIONAL

ARGENTINA—Several reports of prospecting work being done in Argentina have been received. The gold deposits of Agua de Dienisie in Catamarca are being explored, especially in the Farellon Negro section; geological surveys of minerals between La Alumbrera and Agua de Dienisie are under way; and studies of the calcium and copper deposits in the southeastern section of the Chiceana region, Salta, are progressing.

MEXICO—In the Parral-Santa Barbara-San Francisco del Oro mining district, State of Chihuahua, several recent mining activities have been reported: The *Fresnillo Company* has taken over the *Maravillas* and several other mining properties at Naica and is expected to erect a flotation mill soon to treat the ores; the *Messrs. F. C. Schaefer and Associates* are continuing to ship gold-silver-lead ores to the Chihuahua and Torreon smelters; and *Minas de Iguana, S.A.*, a subsidiary of the *Eagle Picher* company continues to increase the tonnage milled at its *Esmeralda* mill near Parral.

CHILE—In the first 11 months of 1950, *Campagnie Miniere du M'Zaita*, at Chagres, produced 14,260 metric tons of copper concentrates compared with 16,078 tons for the 12 months of 1949. According to reports the Chagres smelter may soon be reopened after a shutdown of nearly six years.

BRITISH GUIANA—The *Colonial Development Corporation* has advanced about £472,742 to the *British Guiana Consolidated Goldfields* to carry out the remainder of its development program on sections of the 150,000 acres it controls along the Essiquibo, Konawaruk, Mahdia and Potaro rivers. The program includes the completion of development along the lower Potaro River; the purchase of a new dredge and power equipment to work on the Konawaruk River; and prospecting in other areas of the concession for new gold reserves.

COLOMBIA—*Placer Development, Ltd.*, of British Columbia, Canada, has released 1950 production figures for its three subsidiaries operating in Colombia as follows: *Nechi Consolidated Dredging, Ltd.*, dredged 3,937,000 cubic yards for a recovery of 18,518 fine ounces of gold; *Asnazu Gold Dredging, Ltd.*, 6,468,900 yards for 26,127 ounces; and *Pato Consolidated Gold Dredging, Ltd.*, 15,230,000 yards for 107,670 ounces.

NORTH AMERICA

BRITISH COLUMBIA—*The Consolidated Mining and Smelting Company of Canada, Limited*, will lease the *Polaris-Taku Mining Company's* surface plant on the Tulsequah River about 60 miles east of Juneau, Alaska, and will modify the concentrator to handle ore from Cominco's *Big Bull* and *Tulsequah Chief* operations. Operation at a rate of about 250 tons a day is expected to begin by midsummer of 1951, and a crew of about 200 men will be employed. The arrangement between Cominco and Polaris-Taku provides for a minimum five-year lease. Cominco's Big Bull and Tulsequah Chief properties have been under development during the last three years and adequate ore reserves have been established. Production at the Big Bull will commence this summer with the Tulsequah Chief coming in at a somewhat later date. Ore from the mines will be trucked an average of five miles to the concentrator. Mineral values at both properties occur as a complex copper-lead-zinc ore containing gold and silver. The concentrator will produce a copper, a lead and a zinc concentrate. A late report advises that Consolidated has taken an option on a group of 14 lead-zinc claims north of Golden from *Kootenay Exploration, Ltd.*, and that surface work and diamond drilling are planned.

UNITED STATES—Because of a sulphur shortage in the United States sulphur mining is on the increase and reports of operations have been received for the following companies: *Texas Gulf Sulphur Company* is producing 300 tons of sulphur daily from its Wyoming plant. The *Phillips Petroleum, Shamrock Oil & Gas* and other oil companies are constructing sulphur extraction plants to obtain this by-product of petroleum processing. The *Freeport Sulphur Company* is said to have taken an option to buy 7,700 acres of sulphur-bearing iron ore property in the state of Virginia and has leased a sulphur dome at Bay Sainte Elaine, Louisiana, from the *Texas Company*. Although the latter deposit is not rich, the company expects to build a plant on the property. The lease of four other domes in Louisiana by Freeport also has been reported. These domes are undeveloped and will be explored.

ONTARIO—Chicago's *Inland Steel Company*, through its Canadian operating company, the *Caland Ore Company*, has resumed drilling on the "C" orebody leased from *Steep Rock Iron Mines*, at Steep Rock Lake. The company is using 11 drill rigs, and expects the exploration project will take about four years. Holes are drilled through ice on the lake, water averages 150 deep, and overburden about 380 feet; depth of holes in the present program will average 750 to 1,000 feet.

QUEBEC—Two projects are planned by *Noranda Mines, Ltd.*, of Toronto, Ontario, Canada. One will be the construction of a $4,000,000 plant at an undetermined site to produce elemental surphur, sulphuric acid and iron sinter from pyrite. The second project is to develop a large lowgrade copper orebody in the Gaspe Peninsula, Quebec Province. According to J. Y. Murdoch, president, reserves amount to an estimated 57,000,000 tons of ore with one to two percent copper content. Production of 5,000 tons of ore daily is contemplated and plans are being drawn up for a plant and smelter.

MICHIGAN—Shaft sinking at *Jones & Laughlin Ore Company's* new *Tracy* mine is under way at Negaunee, and work has progressed to about 65 feet below the surface. The central four-compartment shaft, which will employ skips in counterbalance for hoistings, is being set up for hoisting the ore from four separate orebodies. Annual capacity of high grade ore will be about 1,000,000 tons and production will start in 1954. The company expects to use mine cars with locomotives for underground haulage. A 260-foot-long tunnel is being driven between

BILLITON STRIPS OVERBURDEN FROM SURINAM BAUXITE DEPOSITS

The Billiton Company, Inc. (N. V. Billiton Maatschappij) is removing 20 feet of overburden from bauxite deposits at Billiton, Surinam, South America. The overburden, a clay which is very wet because of excessive rainfall (120 inches annually), is stripped by a shovel and loaded in three 16-ton-capacity Tournarockers (see photo) made by R. G. LeTourneau, Inc., Peoria, Illinois, U.S.A. The Tournarockers haul the material 750 feet and end-dump it into mined-out areas. The full round-trip takes the three machines six minutes with a total load of 34.5 pay yards; they replace a narrow-gauge-track locomotive and cars formerly used by the company. When mining begins, ore will be hauled one mile directly to the mill.

the shafts and the timber yard in order to facilitate timber haulage during the long winter. On the surface, temporary buildings are being constructed, and grading of haulage roads and the ground for the spur to relocate the Chicago and Northwestern Railway Company's main line is being pushed.

ALASKA—A gold strike has been made on Falls Creek in the Cache Creek district, according to H. W. Nagley of Anchorage, who owns about 100 claims in that area. He built a two and a half-mile road to the property last summer and completed preparatory work for mining this spring. An airfield will eventually be built. The creeks in the area have been worked out, but Nagley says the benches are rich in gold.

WASHINGTON—The *Anaconda Copper Mining Company* has bought the *Bonanza* lead mine at Bossburg and the Bonanza mill north of Colville for $2,000,000. The company also has an option on the *Gold King* mine near Wenatchee and is sinking an exploratory shaft there. Purchase price for this successful gold mine is said to be $1,000,000.

ONTARIO—*Mensilvo Mines, Ltd.*, Canada's only straight cobalt producer, expects to increase mill output, according to L. C. Herdman, president, as a result of the Dominion government's efforts to stimulate Canada's cobalt production. The company will install additional equipment to raise production to two tons of concentrates and cobbed ore daily, against a present average of one ton of concentrates and some cobbed ore.

CALIFORNIA—Net profit of $117,675 for 1950 operations was announced by *Central Eureka Mining Company* at Sutter Creek, in a preliminary report still subject to audit. In 1949 the company reported a loss of $163,085 and in 1948 a loss of $403,659, according to J. D. Swift, president.

NEWFOUNDLAND—*Pilley's Island Copper (1951), Ltd.*, has been formed by *Frobisher, Ltd.*, and *Halcrow Swayze Mining Company* to explore the Pilley's Island copper-pyrite mine. A lease has been obtained from *Lesjack Exploration Company* which in turn was leasing from the owners, *Blast Furnace Products Corporation* of New York. J. M. Powelson, engineer for Lesjack, will direct operations, which include diamond drilling. The mine in the past produced about 500,000 tons of copper sulphide ore.

QUEBEC—The *Aluminum Company of Canada, Ltd.*, is preparing to re-open its smelter at Beauharnois, which will increase the company's primary aluminum ingot production by 32,000 metric tons a year and will make its potential ingot capacity over 400,000 tons annually. Reopening the smelter, closed since the end of the war, will cost $3,000,000. Alumina will be supplied from the company's Arvida, Quebec, works.

ALASKA—*Taylor Creek Placers* is getting ready for the coming mining season, according to Elmer Keturi, partner, who is setting up equipment, including a dragline, moved from Sleetmute to Taylor Creek. Other partners are John Ogres, Eugene and Gus Uotilla.

NORTHWEST TERRITORIES—A second drill rig and a 10-ton-daily pilot mill will be installed by *Indore Gold Mines*, which is exploring the *Pitch No. 8* group of pitchblende claims at Hottah Lake, according to F. W. Anderson, manager. The company also plans exploration of the *Pitch-Ind* group, five miles south, and the *Pitch 27-28* group, north of the Pitch No. 8 group.

BRITISH COLUMBIA—Construction of a mill building on the property of *Van Roi Consolidated Mines, Ltd.*, at Silverton, is under way. Machinery and equipment for a flotation mill of 100 to 125 tons daily is on hand and production is scheduled for August. The company will mine a larger tonnage than it can treat in the flotation mill, so it has ordered a sink-float plant from Western Machinery Company of San Francisco for delivery later in the year. A stockpile of silver-lead-zinc ore is being built up.

ONTARIO—M. S. Fotheringham, president of *Steep Rock Iron Mines, Ltd.*, recently summarized work to be done at the company's property which will be producing about 3,000,000 tons of iron ore a year by 1955. He said that beneath the *Errington* openpit, which produces 1,000,000 tons annually, a fully mechanized underground mine will be developed by sinking a shaft 1,250 feet deep and opening two levels. The economical block caving method of mining will be used in this mine and it will be designed to produce 1,500,000 tons years. The *Hogarth* openpit mine is being prepared for 1953 operation at a 2,000,000-ton yearly rate. Investigations in the area by Steep Rock and by *Inland Steel Company* of Chicago, Illinois, have shown that there probably exist two to four more orebodies, possibly of comparable size to the Errington and Hogarth orebodies, and further testing is being carried on in those areas.

IDAHO—Net profit for *Silver Dollar Mining Company* in 1950, before taxes, was $165,412. Balance of earned surplus after taxes was $95,725. The company mined 25,583 tons of ore from the Rotbart area of the Chester vein system and from the vein opened on the 3,250 and

WORLD MINING

Issued as an International Department of MINING WORLD

by American Trade Journals, 124 W. Fourth St., Los Angeles, California

A Miller Freeman Publication

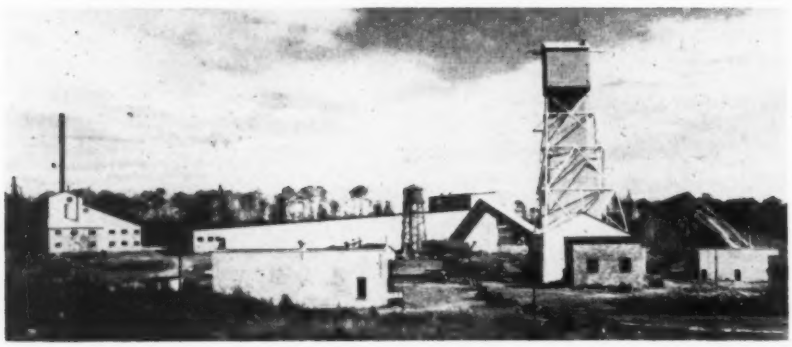
Publisher . . . . W. B. FREEMAN
General Manager . M. F. HOLSINGER
Editor . . G. O. ARGALL, JR., E. M.
Production Manager . J. M. STALUN
Eastern Manager . . K. WEGKAMP
Field Editor . HOWARD WALDRON
News Bureau . . . V. P. COLLINS

Regular correspondents in the following cities and mining centers:

Stockholm, Cyprus, San Jose (Costa Rica), London, Tokyo, Frankfurt, Vancouver, Paris, Mexico City, Helsinki, Redruth (Cornwall), Oslo, Benares (India), Dersley (Transvaal, South Africa), Singapore, Madrid, Ankara, Lima, Rome, Sao Paulo, The Hague, Johannesburg (South Africa), Trondheim (Norway), Port Kembla (N. S. W., Australia), Costermansville (Belgian Congo), Accra (Gold Coast).

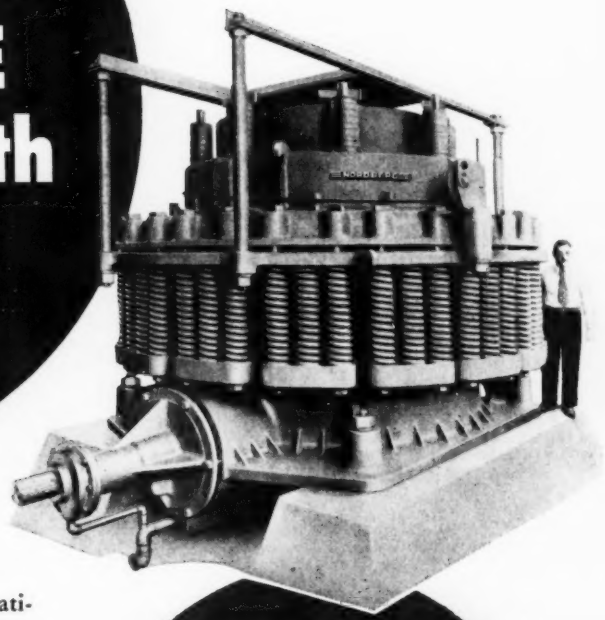
WORLD MINING is published the 26th of each month as a regular department of MINING WORLD and is also circulated as a separate section on a carefully controlled free basis to a selected list of management and supervisory personnel associated with active mining enterprises throughout the world.

CANADIAN MINE ROASTS REFRACTORY GOLD WITH FLUO-SOLIDS



At Red Lake, Ontario, Canada, Campbell Red Lake Mines Ltd. has installed a Dorrco Fluo-Solids System for the roasting of refractory arsenopyrite ores. The building at the extreme left in the photograph houses the System which roasts flotation concentrates to eliminate arsenic and sulphur. The calcine is then cyanided for gold recovery. Three features of the System at Campbell have been, first, the successful roasting of a concentrate containing only 18 percent sulphur, without auxiliary fuel; second, feed has been pumped to the Fluo-Solids Reactor as a slurry at 70 to 80 percent solids, without prior drying; third, shutting down one shift per day has been possible without difficulty being experienced in returning to full operation.

MOST of the World's COPPER ORE is reduced with *Symons Cone Crushers*



To keep pace with modern industry's insatiable demand for more and more *copper* necessitates the use of the most efficient ore reduction machinery.

That's why most of the world's *copper* ore is reduced with Symons Cone Crushers. No other crushers can match their performance in producing a maximum of finely sized product at a minimum cost per ton.

Practically all the major producers in every country in the world where *copper* ore is processed in quantity benefit from the Symons Cone Crusher design that assures uniform controlled feed, maximum liner utilization, protection from tramp iron, and trouble-free operation. Built in both "Standard" and "Short Head" types, Symons Cone Crushers are unsurpassed wherever ores and industrial minerals are processed in quantity.

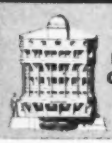
Write for complete information on sizes and types to meet your needs.

REMEMBER...
there are more
Symons Cone Crushers
in use for fine reduction crushing than all competitive makes of gyratory reduction crushers
COMBINED!

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN
NEW YORK • SAN FRANCISCO • WASHINGTON • SPOKANE
MEXICO, D. F. • LONDON • TORONTO • JOHANNESBURG

M151

NORDBERG *Machinery for processing ores and industrial minerals*


Primary Crushers


Vibrating Bar Grizzly


Symons Rod Deck Screen


Grinding Mills


Mine Hoist


Diesel Engines

3,400 levels during the year. Above the 3,700 level ore reserves are now reported as 90,866 tons.

QUEBEC—*Ascot Metals Corporation, Sherbrooke*, which is actively developing its *Moulton Hill* and *Suffield* mines, advises that capacity of the existing mill at the Moulton Hill will be increased from 400 to 650 tons daily, and a permanent mining plant will be installed at the Suffield. The latter also will be completely electrified.

BRITISH COLUMBIA—*Canadian Exploration, Ltd.*, will rehabilitate the *Emerald* tungsten mine near Salmo for the Dominion government. Although the company recently negotiated the sale of the mine's remaining tungsten reserves to the government for $328,000, the government has retained the company as operator. Canadian Exploration will operate, on a cost-plus basis, both the mine and a mill. Estimated lead-zinc reserves at the mine are put at 4,500,000 tons averaging 1.5 percent lead and 6.0 percent zinc. According to Charles Clark, secretary, engineers are now working on the design of the mill and until such time as they have completed their calculations, the company cannot state what the daily tonnage will be, but the figure of 250 tons per day is receiving consideration.

ALASKA-YUKON TERRITORY—Two Juneau, Alaska, men, Pete Taras and Claude Bullard, have organized a company in Dawson, Y.T., and will mine some of their 15 miles of claims along the upper Yukon River. They also have under lease seven new claims on Shorty Creek and five miles of bench land in the Sixty Mile district. They expect to ferry machinery to Haines and then truck it over the highway to their property in time to start mining by May 1.

NOVA SCOTIA—A new company, *Minda-Scotia Mines, Ltd.*, a subsidiary of *Mindus Corporation*, has been formed to acquire, explore and develop an eight-mile square property at Smithfield, 12 miles southeast of Truro. Diamond drilling is beginning. The property is developed by four shafts and about 180 feet of drifts, in which some good samples of ore have been found. Dr. R. A. Halet, Mindus' consultant, is directing operations.

BRITISH COLUMBIA—The Western *Exploration Company, Ltd.*, at Silverton has ordered a new HMS plant for the treatment of lead-zinc ore. The company will install a Wemco No. 2M plant with a capacity of 25 tons per hour of minus-2-inch, plus-10-mesh feed.

ONTARIO—Having completed four new levels, *Macassa Mines, Ltd.*, Kirkland Lake, now plans to open four more. The No. 2 winze will be sunk 500 feet to the 5,775-foot depth by August. (The existing hoist is capable of handling ore from a depth of 8,000 feet.) Macassa milled 128,710 tons of gold ore during 1950 with a net profit of $322,708. R. A. Bryce is president and G. A. Howes is mine manager.

IDAHO—*Coeur d'Alene Mines Corporation* at Wallace is said to be considering the exploration of *Rainbow Mining & Milling Company* ground which is west of the *Vulcan* mine where recent ore discoveries have been made. During 1950 Coeur d'Alene drove 3,708 feet of tunnels and raises and did 6,681 feet of diamond drilling.

UTAH-COLORADO — Representatives of the U. S. Atomic Energy Commission, the Federal Bureau of Public Roads and the Colorado and Utah Highway Departments recently held a meeting to discuss the construction of access roads throughout the Colorado Plateau area in order to aid in uranium ore production. As much as $1,500,000 might be spent on the project if approved.

QUEBEC—A nickel strike has been made at Burn Creek and Knob Lake in the Ungava district, according to Maurice Duplessis, Quebec Premier. Prospecting on one of *Hollinger North Shore Exploration Company's* iron concessions disclosed the vein.

ONTARIO—*Falconbridge Nickel Mines, Ltd.*, is proceeding with the opening and development of a third producing mine in the Levack area, 35 miles west of Sudbury. The company will sink a three-compartment shaft and construct a surface mine plant. Diamond drilling has outlined 3,500,000 tons of ore at this location. The company's *McKim* mine is reaching a 500-ton per day production rate, and the main *Falconbridge* mine is hoisting over 2,500 tons daily.

THE MARKET PLACE

IMMEDIATE UNRESTRICTED

LIQUIDATION

FORMER PROPERTY OF
THE WORLD FAMOUS

TOM REED MINE

ON THE PREMISES IN OATMAN, ARIZONA
25 MILES WEST OF KINGMAN, ARIZONA ON U. S. HIGHWAY 66

MILLING—MINING MACHINERY—SHOP EQUIPMENT—BUILDINGS—ETC.

★IMMEDIATE POSSESSION ★COME PREPARED TO BUY
★TO BE SOLD PIECE BY PIECE OR IN UNITS

CRUSHERS

TRAYLOR 12" BULLDOG, 50-HP Motor

Allis-Chalmers 9"x15" JAW CRUSHER

Allis-Chalmers 12"x24" JAW CRUSHER

Allis-Chalmers 18"x10" CRUSHING ROLLS

BALL MILLS

1—6x6 ALLIS-CHALMERS
1—6x5 ALLIS-CHALMERS
HERRINGBONE GEARED TO DIRECT MOTOR DRIVES
100 H.P. MOTORS

2—5x6 ALLIS-CHALMERS
GRID DISCHARGE HERRINGBONE GEARED TO DIRECT MOTOR DRIVES
75 H.P. MOTORS

CLASSIFIERS

DORR 54"x17' DUPLEX

DORR 4'x20' SIMPLEX

WEMCO 6'x27'x12' BOWL
Model BH BB

MINE HOISTS

DENVER DOUBLE DRUM MINE HOIST
7500 Lbs. at 500 Ft. Per Minute, 150-H.P. Motor
72" DRUMS, 48" FACE, 3000' CABLE

DENVER SINGLE DRUM MINE HOIST
40" Drum, 5" Flange, 15" Face; 52-H.P. Motor

COMPRESSORS

20"x12"x16" INGERSOLL-RAND Imperial Type 10
150-H.P. Motor

15"x9"x12" INGERSOLL-RAND, 100-H.P. Motor

15"x9"x12" INGERSOLL-RAND, 60-H.P. Motor

50,000 FEET OF PIPE — 2 inch to 8 inch

VALVES - FITTINGS, ETC.

APRON FEEDERS
WILFLEY SAND PUMPS
TRIPLEX PUMPS
DIAPHRAGM PUMPS
AGITATORS
HI & LOW HEAD THICKENERS
BRAUN PULVERIZERS
LAB. CRUSHERS, ROLLS, ETC.

Various Sizes
STEEL & WOOD TANKS

75 TON GRINDING BALLS

14" - 16" - 18" - 24" BELT CONVEYORS

BODINSON MFG. CO.
TROMMEL SCREEN
48"x8' SCREEN, 5' SCRUBBER

14"x60'
ROBBINS DISTRIBUTOR CONVEYOR

MERRILL-CROWE
300 TON PRECIPITATION UNIT

COMPLETE
AUTOMATIC SAMPLING PLANT

MERRICK WEIGHTOMETER

DRILL STEEL
DRIFTERS, STOPERS, COLUMNS
MINE RAIL, CARS, BUCKETS, ETC.
AIR TUGGERS, CHAIN HOISTS, ETC.
AIR RECEIVERS
BLOWERS, ETC.
FURNACES
SHEAVE WHEELS, CABLE, ETC.

SPARE
ELECTRIC MOTORS
TO 150-H.P.

SHOP EQUIPMENT

12" - 24" METAL LATHES
20" SHAPER
POWER FEED DRILL PRESSES
STANDARD BOLT CUTTER

POWER PIPE THREADER
STEEL SHARPENERS
BLACKSMITH SHOP

24" WOOD PLANER
BAND & CUT-OFF SAWS
TABLE SAWS
ELECTRIC WELDER, ETC., ETC.

CORRUGATED STEEL COVERED BUILDINGS — LARGE QUANTITIES HEAVY TIMBERS — LUMBER — TRAMWAY WITH TRESTLES — EXTRA LINERS FOR MILLS — SPARE PARTS — SUPPLIES — ETC., ETC.

NOTE: Most of this equipment is in exceptionally fine condition, some being in use less than 1 year. Electric current 440 volts, 60 Cycle (3 Phase).

LIQUIDATING

MACHINERY AND EQUIPMENT FORMERLY BELONGING TO THE

TOM REED MINE

COMPLETE CATALOG ON REQUEST

FOR FURTHER INFORMATION
WRITE, WIRE, PHONE MR. FRANK T. MILES, IN CHARGE OF SALES ON PREMISES
TOM REED MINE — P. O. BOX 404 — PHONE OATMAN, ARIZONA, 38 R3L3S

SANTA FE

Continued from Page 37

The upper section of the limestone usually contains the highest grade mineralization. Uranium minerals are found along bedding planes and coating fractures and cracks across the bedding. The following uranium minerals have so far been identified: carnotite (potassium-uranium-vanadate), tyuyamunite (calcium-uranium-vanadate), uranophane (calcium-uranium-silicate), rutherfordine (uranium carbonate), gummite and pitchblende. The pitchblende is found as minute blebs up to three millimeters in diameter and is surrounded by halos of secondary minerals. Some calcite, fluorspar and pyrite have also been found.

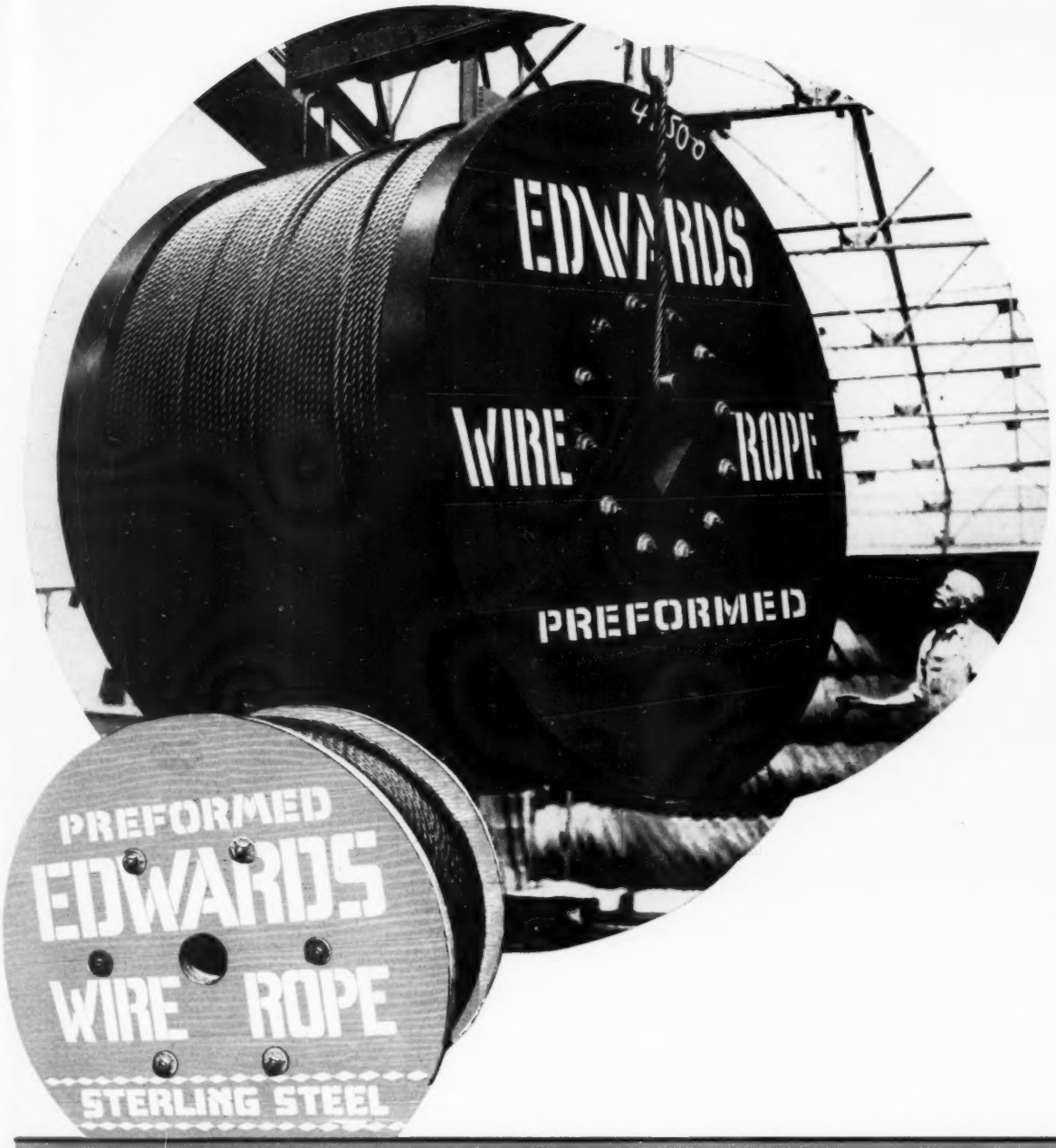
Mill Test Results

Metallurgical test work conducted by the U. S. Atomic Energy Commission has shown that the uranium can be recovered more easily than was at first believed possible. After grinding to minus-200-mesh, a five percent soda ash leach will take a high percentage of the uranium minerals into solution.

Today and Tomorrow

Today Grants is a boom town with prospectors, engineers, geologists and field scouts for the larger mining companies making it their headquarters. While prospectors carry samples of ore and Geiger counters through the streets, geologists with rolls of maps under their arms dash out of town to check every newly reported discovery.

What tomorrow will bring to Grants is being determined by Evans' busy field crews. Everyone hopes the answer will mean a new uranium processing plant and more fuel for the rapidly expanding AEC program.



YOU CAN BET YOUR LIFE ON

EDWARDS
WIRE ROPE

Head Office: SAN FRANCISCO • Main Plant: SOUTH SAN FRANCISCO

Branch offices

SEATTLE • PORTLAND • LOS ANGELES • HOUSTON

Distributors throughout the West, Gulf Coast and Mid Continent

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.

FREE-LITERATURE PREVIEW

To get any item of free literature illustrated or described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP postcard, fill out the PEP card completely, and drop it in the nearest mailbox.

PORTABLE ELECTRIC SAW: For complete information on Independent Pneumatic Tool Company's new low-priced 6-inch Thor portable electric saw, circle No. 1 on PEP card.

PUMP AND MOTOR: Design and construction features of a close-coupled pump and motor, the electrifugal, are described in a bulletin just released by Allis-Chalmers Mfg. Company. It has a single shaft mounted in an exclusive unit-cast frame to assure perfect and permanent alignment. Circle No. 2 on PEP card for Bulletin 52B6140B.

GEAR DRIVES: Link-Belt Worm Gear Drives of three basic types, each available in 10 different sizes, for fractional or large horsepower, and in speed ratios of 3⅝ to 1 up to 8,000 to 1, are illustrated in a new 80-page Book No. 2324. Circle No. 3.

LOADER: The Joy Manufacturing Company 18-HR-2 loader, designed for high-capacity tonnage in metal and non-metallic mines, is described and illustrated in a new bulletin. Bulletin No. J-108. Circle No. 4.

ROD MILLS: The Hardinge Company has just published revised literature on rod mills for grinding and pulverizing. Bulletin 25-B discusses the new type Convex-Head Hardinge rod mill as well as the standard Hardinge Conical-Ended rod mill. Circle No. 5 on PEP card.

TRUCK BODIES AND HOISTS: Complete information on heavy duty Heil bodies for your off-the-road dumptrucks or earth movers, and Heil hydraulic dumptruck hoists will be sent to truckers who circle No. 6.

EXCAVATOR: Marion Power Shovel Company has released a bulletin describing the Marion type 43-M machine, an all-purpose 1 cubic yard excavator. Bulletin No. 400. Circle No. 7.

TRICONE MILLS: A catalog describing the operating principle of the Hardinge Company tricone mill, including a discussion of ball segregation, design features and performance data, has been released. Circle No. 11 for your bulletin, AH-414.

ROTATING EQUIPMENT: A new 24-page booklet contains a series of articles written by Fraser Jeffrey, assistant to Allis-Chalmers' chief electrical engineer, who authoritatively describes preventive maintenance and machine repair of electrical machines. Copies of "Care of AC Ro[illegible]" 04B7417 are avail-
ab
yo

C
ce
si
tv
de
le

P
ir
it
C
C
N

I
a
i
n
e
I
I
t
t
t
1

A

I

obtained by writing to Dept. C, Dow Chemical Co., 310 Sansome Street, San Francisco, or by circling 21.

BITS: How to successfully recondition tungsten-carbide bits is shown in a 20-page book released by Rock Bit Sales & Service Company. Many helpful operating suggestions are given for obtaining the maximum speed and footage out of carbide bits. This information is yours if you circle 23.

MINERAL TESTING LABORATORY: The Western Machinery Company announces the opening of a Mineral Testing Laboratory to provide a world-wide mineral testing service on a cost basis. Additional information on the new laboratory will be sent to you; circle No. 24.

REAGENTS: An eight-page bulletin containing interesting resumes of the application of American Cyanamid reagents to a variety of copper ores in Canada, Mexico, South America, Africa, Australia and the United States has been issued by American Cyanamid Company. For copies of "Current Reagent Practice on Copper Ores," circle No. 25.

SPECIAL TRACTOR TOOLS FOR MINING: Hyster accessories for Caterpillar tractors, including the "Hystaway" ½ yard excavator and a complete line of winches, yarders, cranes, and donkeys. Provides versatile range of uses in mining

TIGHT

BOU

SPIRAL CONCENTRATOR: The paper presented at the International Conference on Coal Preparation in Paris, "The Humphreys Spiral Concentrator for Cleaning Minus-¼-inch Coal," is made available to you by the Humphreys Investment Company. Get this 8-page bulletin by circling No. 40 on the MINING WORLD PEP card.

CARBIDE-INSERT DRILL STEEL: A description of Black's Machine Shop's line of carbide-insert drill steel in ⅞" and 1" sizes from 2' to 8' in length, the statement of guarantee on the specially forged, high-alloy steel, and a price list will be sent to all miners who circle No. 41 on the PEP card.

DIESEL ENGINES: A new catalog, released by Detroit Diesel Engine Division of General Motors, describes the complete line of Series 71 2-cycle diesels for use in the Industrial, Petroleum and Marine fields. Get your copy from your GM distributor or dealer, or write on your letterhead to Detroit Diesel Engine Division, Advertising Department, 13402 W. Outer Drive, Detroit 28, Mich.

No
Postage Stamp
Necessary
If Mailed in the
United
States

HTLY

UND

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.

FREE-LITERATURE PREVIEW

To get any item of free literature illustrated or described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP postcard, fill out the PEP card completely, and drop it in the nearest mailbox.

PORTABLE ELECTRIC SAW: For complete information on Independent Pneumatic Tool Company's new low-priced 6-inch Thor portable electric saw, circle No. 1 on PEP card.

PUMP AND MOTOR: Design and construction features of a close-coupled pump and motor, the electrifugal, are described in a bulletin just released by Allis-Chalmers Mfg. Company. It has a single shaft mounted in an exclusive unit-cast frame to assure perfect and permanent alignment. Circle No. 2 on PEP card for Bulletin 52B6140B.

GEAR DRIVES: Link-Belt Worm Gear Drives of three basic types, each available in 10 different sizes, for fractional or large horsepower, and in speed ratios of 3⅝ to 1 up to 8,000 to 1, are illustrated in a new 80-page Book No. 2324. Circle No. 3.

LOADER: The Joy Manufacturing Company 18-HR-2 loader, designed for high-capacity tonnage in metal and non-metallic mines, is described and illustrated in a new bulletin. Bulletin No. J-108. Circle No. 4.

ROD MILLS: The Hardinge Company has just published revised literature on rod mills for grinding and pulverizing. Bulletin 25-B discusses the new type Convex-Head Hardinge rod mill as well as the standard Hardinge Conical-Ended rod mill. Circle No. 5 on PEP card.

TRUCK BODIES AND HOISTS: Complete information on heavy duty Heil bodies for your off-the-road dumptrucks or earth movers, and Heil hydraulic dumptruck hoists will be sent to truckers who circle No. 6.

EXCAVATOR: Marion Power Shovel Company has released a bulletin describing the Marion type 43-M machine, an all-purpose 1 cubic yard excavator. Bulletin No. 400. Circle No. 7.

TRICONE MILLS: A catalog describing the operating principle of the Hardinge Company tricone mill, including a discussion of ball segregation, design features and performance data, has been released. Circle No. 11 for your bulletin, AH-414.

ROTATING EQUIPMENT: A new 24-page booklet contains a series of articles written by Fraser Jeffrey, assistant to Allis-Chalmers' chief electrical engineer, who authoritatively describes preventive maintenance and machine repair of electrical machines. Copies of "Care of AC Rotating Equipment," O5R7417, are available. Circle No. 12 on PEP card and get yours.

CONCENTRATOR: The Weinig Concentrator effecting a gravity separation in size ranges from ¼-inch to 35 mesh (between flotation and sink-float ranges), is described in Colorado Iron Works Bulletin No. 50. Circle No. 13.

PUMPING UNITS: Economical pumping units for every industry are cataloged in a new "Handy Guide to Selection of Centrifugal Pumps" released by Allis-Chalmers. For Bulletin 52B6059G, circle No. 17.

DIESEL ENGINES: Increased horsepower and improved performance are stressed in a specification pamphlet describing the new International Model UD-6A diesel engine and power unit, published by International Harvester Export Company. Engineering design changes have increased the horsepower from 39 at 1,500 rpm. to 45 at 1,600 rpm., and have boosted the compression ratio from 14.2:1 to 16.18:1. Circle No. 19.

AUTOMATIC COUPLERS: Circulars No. 1746 and No. 5240 contain details on application of Willison automatic couplers to your cars and your jobs to enable you to handle more tonnage per day with maximum safety. Circle PEP No. 20.

FLOTATION INDEX: 1950 edition of Dow Chemical Company's authoritative guide to published material on flotation methods is now available. Copies may be obtained by writing to Dept. C, Dow Chemical Co., 310 Sansome Street, San Francisco, or by circling 21.

BITS: How to successfully recondition tungsten-carbide bits is shown in a 20-page book released by Rock Bit Sales & Service Company. Many helpful operating suggestions are given for obtaining the maximum speed and footage out of carbide bits. This information is yours if you circle 23.

MINERAL TESTING LABORATORY: The Western Machinery Company announces the opening of a Mineral Testing Laboratory to provide a world-wide mineral testing service on a cost basis. Additional information on the new laboratory will be sent to you; circle No. 24.

REAGENTS: An eight-page bulletin containing interesting resumes of the application of American Cyanamid reagents to a variety of copper ores in Canada, Mexico, South America, Africa, Australia and the United States has been issued by American Cyanamid Company. For copies of "Current Reagent Practice on Copper Ores," circle No. 25.

SPECIAL TRACTOR TOOLS FOR MINING: Hyster accessories for Caterpillar tractors, including the "Hystaway" ½ yard excavator and a complete line of winches, yarders, cranes, and donkeys. Provides versatile range of uses in mining operations. Complete literature available from MINING WORLD. Circle No. 34.

SAND PUMPS: For complete literature on a line of sand pumps specifically designed for pumping sands and slurries in mines, mills, and smelters, write to Allen Sherman-Hoff Co., 223 S. 15th St., Philadelphia 2, Pa., or circle No. 36 on the PEP card.

REBUILDING WORN TRACTOR PARTS: To get your copy of an informative new Stulz-Sickles Co. booklet which tells you how to use Stulz-Sickles' tools and Manganal welding rod in the rebuilding of worn idler wheels, drive sprockets, dozer blades, and other tractor parts, circle No. 37 on the MINING WORLD PEP card.

ROLLER CHAINS: Tension linkages, and numerius examples of uses for roller chain are described, illustrated, and cataloged in a new handbook released by Chain Belt Company, 1600 W. Bruce St., Milwaukee 4, Wis. and written for designers of tension linkages. Circle No. 38 for your copy.

MINING MACHINERY: A new 28-page two-color bulletin describes the complete line of machinery manufactured by Nordberg Manufacturing Co., Milwaukee 7, Wis. Miners and mill men will get valuable information by reviewing this line of Diesel engines, Symons Cone Crushers and Screens, mine hoists, grinding mills, and railroad equipment. Circle No. 39.

SPIRAL CONCENTRATOR: The paper presented at the International Conference on Coal Preparation in Paris, "The Humphreys Spiral Concentrator for Cleaning Minus-¼-inch Coal," is made available to you by the Humphreys Investment Company. Get this 8-page bulletin by circling No. 40 on the MINING WORLD PEP card.

CARBIDE-INSERT DRILL STEEL: A description of Black's Machine Shop's line of carbide-insert drill steel in ⅞" and 1" sizes from 2' to 8' in length, the statement of guarantee on the specially forged, high-alloy steel, and a price list will be sent to all miners who circle No. 41 on the PEP card.

DIESEL ENGINES: A new catalog, released by Detroit Diesel Engine Division of General Motors, describes the complete line of Series 71 2-cycle diesels for use in the Industrial, Petroleum and Marine fields. Get your copy from your GM distributor or dealer, or write on your letterhead to Detroit Diesel Engine Division, Advertising Department, 13402 W. Outer Drive, Detroit 28, Mich.

If mailed from outside United States, place postage stamp here →

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 3430, Sec. 34.9, P. L. & R., San Francisco, Calif.

MINING WORLD — WORLD MINING

PEP DEPARTMENT

121 Second Street

SAN FRANCISCO 5, CALIF.

PEP Editor 1

MINING WORLD-WORLD MINING

Please send me complete and free information on the following equipment described in your PEP section, and keyed by the numbers I have circled:

⟶ CIRCLE NUMBERS YOU DESIRE																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Also send further free information on the equipment advertised on page:

_____; Product _____ ; Manufacturer _____

_____; Product _____ ; Manufacturer _____

Name _____ Title _____

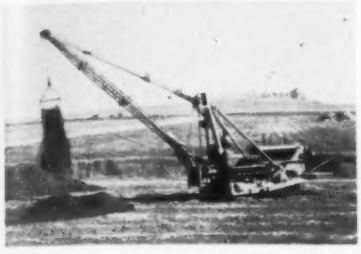
Company _____

Address _____

City _____ Zone _____ State _____

Improved Excavation Crane Now Does Five Jobs

The Hyster Company, Portland, Oregon, has improved the Excavator-Crane so that, mounted on your Caterpillar D6, D7, or D8 tractor, it makes your "Cat" into a combination shovel, dragline, crane, backhoe, clamshell. It can be mounted in one hour by two men after the initial installation; removal



takes only half an hour. Mining and exploration crews which find the Caterpillar a useful tool may well find that the Hystaway Excavator-Crane is indispensible.

A new 16-page catalog, profusely illustrated with operational photographs of the five-in-one in action, is now available. Get your copy by circling No. 79 on the MINING WORLD PEP postcard.

Motogear Uses Detachable Gear and Motor Units

Link-Belt Company announces that it has developed a new packaged power unit, called Link-Belt Motogear, consisting of a compact, enclosed helical gear drive with separate standard motor, flexibly coupled and mounted on one welded steel base plate which provides for convenient adjustment, should shaft realignment be necessary for any reason.

Link-Belt Motogears are built in a variety of sizes, in double or triple reductions, in a wide range of ratios and horsepowers, with input and output shafts concentrically in line.

The Helical Gear Drive used on Motogears like that employed in the corresponding Link-Belt Gearmotor, except that on the Motogear the motor is coupled to the input shaft and mounted on a base plate instead of being integrally secured to side of drive, is also available as a separate self-contained unit without the motor.

Complete information on Gearmotors, Motogears and separate Helical Gear Drives, 1 to 75 hp., is given in a new 16-page Link-Belt Book No. 2247-MW; circle No. 75.

DorrClone Classifiers Available in 3-24" Sizes

For use in desliming, degritting, dewatering, classifying, and thickening without the use of heavy media, the DorrClone (Dutch State Mines Cyclone) is now available in sizes of 3, 6, 12, and 24 inches inside diameter to process flows ranging from 5 to 600 gpm. per unit.

With the exception that it works on wet pulp, the DorrClone is similar in construction and operation to the widely used dust-collecting cyclone. Feed pulp, a mixture of vari-sized solids in liquid, enters the cylindrocone tangentially at a point near the top. The pulp whirls, utilizing a centrifugal force that is many times greater than the force of gravity. Coarse material whirls to the outside, down into the conical section, and is drawn off as underflow through a tailpipe at the bottom. Fine material and liquid is forced to the center, spirals upward, and is discharged through a vortex finder as an overflow product.

Dorrco recommends the new device for desliming of most nonmetallics prior to concentration, degritting of pigments and fillers, dewatering the underflow of hydroseparators, classifying materials at a point down to 10 microns, or thickening of deslimed products down to 10 microns in size.

Dorrco, which is prepared to furnish auxiliary equipment for a complete installation, lists these advantages of its DorrClone: low installation costs; low floor-space requirements; ability to make separations of flocculent micron-range pulps without dispersal or excessive dilution; and production of a cleaner coarse underflow. For free descriptive literature circle PEP No. 71.

Flat-Top Carbide Bit For Limited Budgets

The manufacturer of crown carbide Rok-Bits announces the addition to their line of a tungsten-carbide bit of the conventional flat-top type. This bit is recommended by the manufacturer, Rock Bit Sales & Service Company, for users with limited budgets. This addition to the Rock Bit line extends the wide range of bit types available from this source for practically any application. Circle No. 76.

Specifications of New Diesel Now Available

Increased horsepower and improved performance are stressed in a specification pamphlet describing the new International model UD-6A diesel engine and power unit. Engineering design changes have increased the horsepower from a previous figure of 39 at 1,500 rpm. to 45 at 1,600 rpm. and have boosted the compression ratio from 14.2:1 to 16.8:1.

The booklet points out new features of the new model including a redesigned precombustion chamber and piston, the "A" series I.H. fuel injection pump, simplified injection nozzles, counterbalanced crankshaft and new connecting rods. Also given are performance charts and equipment combinations. Another section of the pamphlet covers the attachments for this engine and includes an account of the value and use of each.

Copies of the pamphlet may be obtained by circling No. 72 on the handy PEP card.

Perma-Drum Separator Illustrated in Catalog

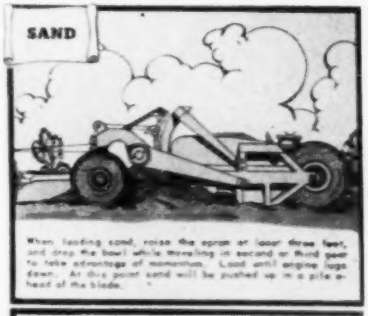
A new eight-page catalog describes and illustrates the application, operation and design of the Dings non-electric, Alnico Perma-Drum Magnetic separator.

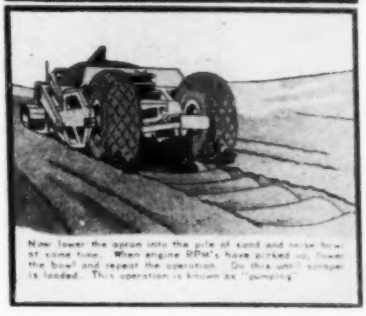
The Perma-Drum can be used for tramp iron removal, concentration of magnetic substances from associated nonmagnetics, purification of product from contaminating iron, reclamation of iron from foundry refuse, slag, sand, etc., and scrap separation. Available in three models, the design features of each are covered in the explanatory text. Information on correctly selecting a Perma-Drum for a given application together with data on capacities and dimensions is included. Typical installation diagrams are shown with recommendations.

Copy of this catalog can be obtained by circling No. 73.

Cartoon Booklet Tells How to Use Caterpillars

A 32-page color booklet just released by Caterpillar of Peoria, Illinois, outlines operating methods in cartoon style. It tells how and when to use bulldozers, how to pioneer side-hill cuts for roads or benches, how to use a "Cat" for push





loading, how to work equipment in frozen ground, how to work on soft fills; it gives hints on use of scrapers, on the tricky job of loading boulders, and many other jobs.

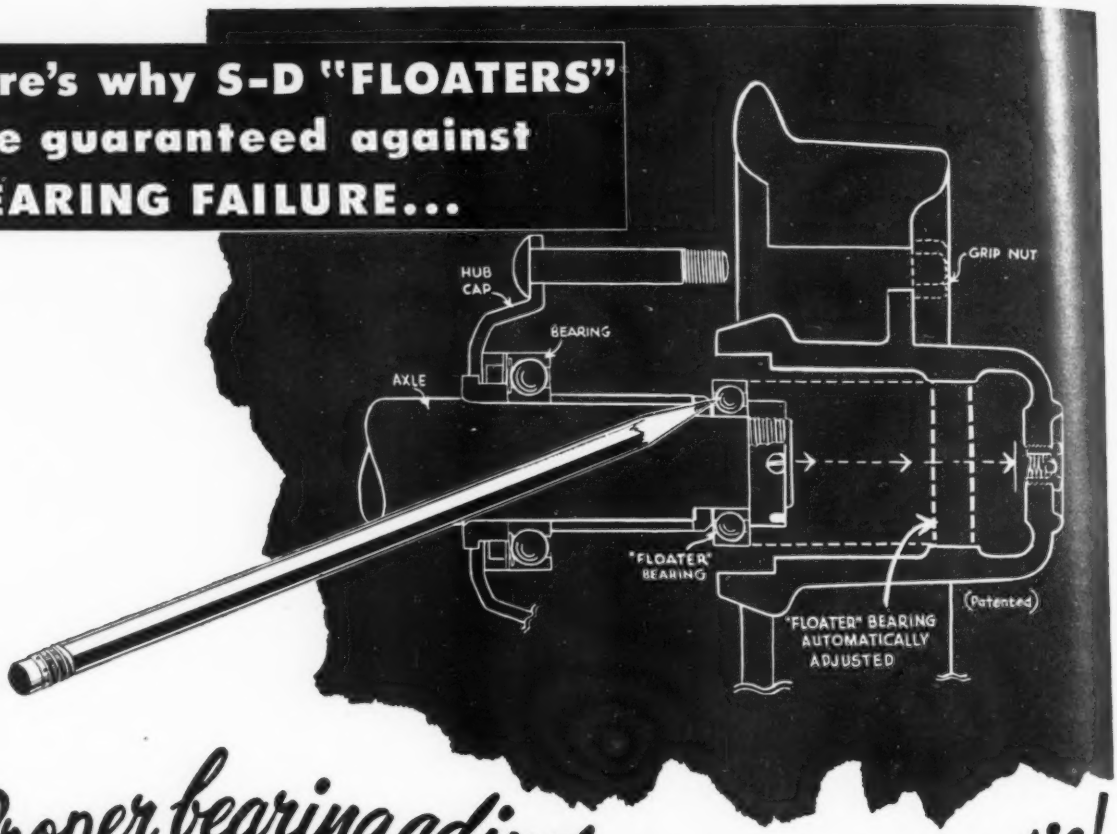
Packed full of helpful information, this new booklet is a must for users or prospective users of earth moving equipment. Get your free copy today, by circling No. 81 on the MINING WORLD PEP card.

Sand Pump Problems Answered in Bulletin

Answers to the pumping problems created by pulps carrying sand and other abrasive solids are presented in Western Machinery Company's newly released eight-page bulletin on the WEMCO San Pump.

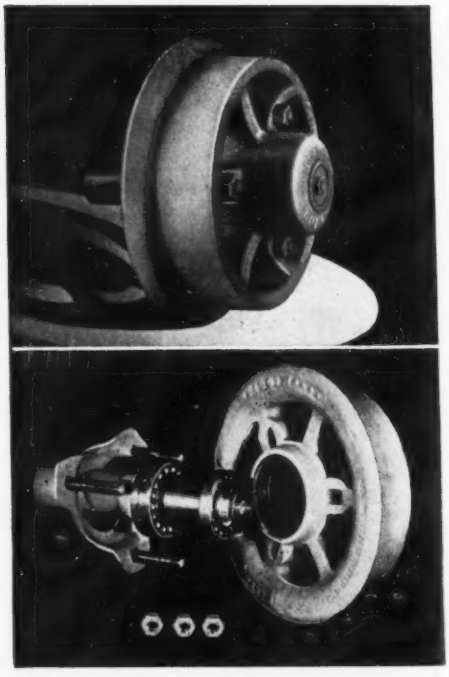
Stressing the need for extreme reliability in this type of equipment, the bulletin describes and illustrates the mechanical features in detail. Tables of pump capacities, pipe friction and pulp densities will aid the engineer or plant superintendent in determining and specifying his sand pump requirements. Circle No. 74 and get your copy.

here's why S-D "FLOATERS" are guaranteed against BEARING FAILURE...



Proper bearing adjustment is automatic!

Because one of the two bearings "floats" into perfect adjustment, there are never any loose or tight bearings on S-D "Floater" Ball Bearing Wheels. That's why we can guarantee the "Floater" wheel against bearing failures for 5 years. Diagram above of a demounted "Floater" shows the heart of the wheel—that magic "floating" bearing that automatically adjusts itself when wheel is mounted and the three retaining bolts are pulled up tight. The extra large bearing absorbs all side thrusts and carries the bulk of the load. Any workman on the job can remove and replace a "Floater" Wheel because "Floater" bearings always remain in perfect adjustment on the axle whether the wheel is off or on. Remember, too, that "Floaters" have solid closed front hubs and positive back seals to keep foreign matter out and grease in! That's why so many "Floaters" often run 5 years and more on a single greasing. The S-D "Floater's" low cost of operation is certainly worth investigating. Without question, S-D "Floaters" run easier, run smoother and cost far less in maintenance than any other mine car wheel!



FOR COMPLETE INFORMATION, WRITE
SANFORD-DAY IRON WORKS, KNOXVILLE, TENN.

SANFORD - DAY IRON WORKS

precipitates—SOUTHWEST

Basic Mag Plant Features In Several New Projects

From the Basic Magnesium Plant at Henderson, Nevada, come several new reports, one concerning the state's plan to sell the Plant to private companies, and others concerning installations by lessees of parts of the Plant. In regard to the first, Governor Charles Russell said that "problems at Basic Magnesium and the town of Henderson will continue to arise as long as the project remains tax free and under state supervision. I believe that the district there should become a part of the state rather than a ward of the state."

At present the Colorado River Commission, the governing board for the Plant, has granted long-term leases with options to purchase to the Combined Metals Reduction Company, the National Lead Company, the Stauffer Chemical Company, the Western Electrochemical Company, and the United States Lime Products Corporation, and to various smaller companies. Should these companies own parts of the Plant outright, a more permanent and profitable industrial status would result, proponents feel.

As far as installations are concerned, Combined Metals Reduction Company, which was the largest producer of lead and zinc in Nevada in 1950, is engaged in expansion projects to cost about $1,750,000. One of these projects is a $250,000 plant and furnace, to be installed at Henderson, for the manufacture of ferro-manganese. The company hopes to obtain sufficient power soon to start operating the furnace by June this year. Another plan of the company is the eventual production of 7,500 tons of lead, 10,000 tons of zinc oxide and 9,000 tons of manganese oxide, by the construction of plants for the hydro-metallurgical treatment of oxide ores from Pioche, Lincoln County, Goodsprings and other Clark County properties.

National Lead Company has announced that it expects to complete construction of its new treatment plant in a total of 120 days and will be producing titanium by July. The company's holdings at Henderson consist of two refinery buildings, peat storage facilities, and several other buildings, 80 acres of land and two units of the Basic Magnesium Plant with an option on a third.

Crosscutting at Atwood Discloses Unknown Vein

C. H. and S. A. McIntosh, operators and lessees of *Atwood Copper Mines* at Lordsburg, New Mexico, have granted a sub-lease to Ira L. Moseley of Lordsburg on all of their leased property above the sill of the 750-foot level. The *Atwood* is a well known copper mine and has produced about 120,000 tons of copper-silver-gold ore, under the supervision of C. H. McIntosh, since 1943. This ore had a weighted average of 1.90 percent copper, 5.1 ozs. silver, and 0.059 oz. of gold per ton. Sub-lessee Moseley has driven a crosscut to the main vein, known as the South Vein, on the 750-foot level, and reached the vein on March 3rd, disclosing a strong continuation of the vein on its downward trend, with a metallic content apparently much higher than any other ore thus far developed in the mine. Sampling will follow the driving of drifts along the vein, and until this occurs ore value is judged only by its appearance.

The crosscut to the South Vein also crossed an unknown vein at about 100 feet south of the shaft, which new vein gives great promise of highgrade production. It has a width of about eight feet, including a highgrade streak of about two feet, which assayed 10 percent copper. After the South Vein has been further explored, the new one will also be explored and developed. Deepening of the 792-foot three-compartment Atwood shaft, and development of the veins in depth are the long-range objectives of the joint tenant operators, and it is hoped to inaugurate this deep level exploration at an early date.

Machinery at Tom Reed Mine Offered for Sale

All assets of the famous Tom Reed gold mine of Arizona, situated at Oatman, about 25 miles from Kingman, are being liquidated, according to recent advices to MINING WORLD. All machinery, including mining, milling, shop, pipe and pumping equipment, is offered for immediate sale on the mine premises. In charge of sales on the property is Frank Miles, Tom Reed Mine, P.O. Box 404, Oatman, Arizona. Milling equipment being offered includes a complete array of crushers, ballmills, classifiers, compressors, etc.

The *United States Atomic Energy Commission* has called for sealed bids for 45,000 to 90,000 feet of diamond-core drilling for the Lukachukai Mountains Project in northeastern Arizona. Estimates

INTERNATIONAL MINERALS PRE-GROUTS NO. 4 SHAFT AREA

Two churn drills and a rotary drilling rig are being used to drill test holes at the No. 4 shaft site of the International Minerals & Chemical Corporation near Carlsbad, Eddy County, New Mexico. In this area 13,650 sacks of cement have been pumped into the water-bearing limestone 195 feet below the surface through 14 grout holes drilled by the Halliburton Oil Well Cementing Company. Pressures up to 3,000 pounds per square inch were necessary to implace some of the grout. Sinking of the No. 4 shaft will start as soon as the No. 3 shaft is completed. The new shafts form only a part of International's program designed to develop new areas for production adjacent to the orebody now being mined. George T. Harley, International's potash Division manager, supervises the Carlsbad operations. Charles Hicks, geologist, has been in charge of the pre-grouting.

place the number of holes to be drilled at 300 with an average depth of 150 feet. All holes will be vertical starting from the surface. Maximum depth will be 500 feet. The area to be drilled is northwest of the producing mines of the district. A new road is being built from Cove, Arizona, up Mesa V to afford access to the drilling area. Sealed bids will be opened by the Commission at Grand Junction, Colorado, at 10:00 a.m. on April 2, 1951.

The *Copper Queen Branch, Phelps Dodge Corporation*, Bisbee, Arizona, expects to have the first equipment at work on its open-pit project about the first of April. The equipment which is to be used will include 5-yard shovels and 25-ton trucks driven by 300-horsepower Diesel engines. The first pit mining will begin in the area of the Johnson Addition and will move west toward the former location of the House of Neighborly Service, then south to the area of the orebody proper, near the old *Sacramento* pit. From that point it will move in a southeasterly direction to Mammoth Hill, nicking Bauer Hill. The new pit reportedly will measure about four times the area of the Sacramento pit, which covered 35 acres. Waste will be removed from the pit to the No. 7 dump west of Bakerville. Fifty-foot benches will be used for mining the orebody which is an extension of the one mined at the Sacramento pit. The entire operation will be highly compact with the crusher to be located in the pit and the mill on Bauer Hill. Preparatory work has included the moving of houses, railroad tracks and the highway and power lines. The Bisbee east orebody is estimated to contain 41,000,000 tons of concentrating ore averaging 1.14 percent copper; and 31,000,000 tons of material to be leached averaging 0.42 percent copper.

The *Hillside Investment and Mining Company* has started work at the Grand View mine, a group of four gold-silver claims in the Cottonwood district. C. F. Weisman, 2801 North Oracle Road, Tucson, Arizona, is manager. Present work consists of drifting along the vein at the 45-foot level. The Grand View is owned by W. C. Best of San Diego, California.

About 400 tons of copper-zinc ore were shipped from the *Atlas* mine in December. The present operator is *B. S. & K. Mining Company*, 3009 North 39th Street, Phoenix, Arizona. H. H. Brown is president, employing a crew of four men and tramming the ore from openpit workings.

The *Bear Canyon* asbestos mine, on the San Carlos Indian Reservation, is being worked by R. G. Robertson, lessee, Globe, Arizona. Production is running from 100 to 150 tons of asbestos monthly. Fourteen men are employed.

The *Bonanza Mining Company*, Wenden, Arizona, is putting in a new gallows frame and is straightening the shaft for a larger skip. The crosscut on the 500 level has been advanced about 50 feet. Roy R. McDonald is president and manager, employing a crew of 16 men on a three-shift basis.

Fred Vollmar, at one time operator of the *Black Mammoth* mine at Silver Peak, Nevada, is said to be associated with several California men in plans which include reactivating the George McGinness claims and adjacent properties in Grass Valley, California, and the eventual construction of a custom mill at or near Austin, Nevada. The McGinness group evidently will be worked first for fluorspar, manganese and tungsten. If the mill is built it will handle lead-silver, manganese and tungsten ores from the Austin area.

A titanium property in San Benito County, near San Juan Bautista, California, may be placed in operation by Richard Hall of Redding, lessee. The property is said to contain thorium, vanadium and zircon, besides titanium.

Pacific Coast Mining and Milling Company is rehabilitating the old *Bagdad-Chase* mill at West Barstow, San Bernardino County, California, where gold from the Bagdad-Chase mine near Ludlow used to be milled. The mine operated in the early 1900's and about 20 acres of tailing, comprising an estimated 120,000 tons exist and will be re-treated by the present operators for gold, silver and copper values. Several other operators have recovered values from reworking these tailings. According to A. O. Dietierle and Clarence R. Morris of Pacific Coast, custom ores will be accepted at the mill also. The company will install 12 flotation cells, ball mill, classifier and crushers, will build an assay office and laboratory and other buildings. Cost of plant modernization is estimated at $50,000.

J. P. Branley of Greenville, California, has acquired 16 claims of the *Hornet*

group, including the *Grizzly Copper Nos. 3* and *4*. The group is a narrow-vein copper prospect in Sec. 35, T. 25 N., R. 11, M. D. B. & M., Plumas County, California.

The *Pinto Basin Mining and Milling Company* is operating its cyanide plant in the Pinto Basin, Riverside County, California, with a crew of 16 men. *Gold Rose* flotation plant in the same area and the Harold Smith flotation plant near Dale Wells, east of Twentynine Palms, also are operating. According to reports, the resumption of full-time milling in this area recently is the first in several years.

Fred E. Groover, owner of the old *Oro Mego* lead-gold-silver mine, 19 miles southeast of Twentynine Palms, California, on the east side of the Pinto Mountains, has leased the mine to James B. Utt and John Knox of Santa Ana. Under Groover's direction, a shaft is being sunk is now at the 80-foot point, and will be sunk to 100 feet, from which level drifting in two directions will be done. If ore continues downward, further shaft sinking is contemplated. The mine is developed by two adits and two open pits which have exposed gold, silver, lead and copper ore. Recently 29 tons of concentrates were shipped to the Selby smelter. Groover lives at 1223 W. Bay Avenue, Newport Beach; Utt at 514½ N. Main Street, and Knox at 420 E. Fourth Street, Santa Ana.

At the *Last Chance* gold mine north of Nevada City, California, the *Shamrock Mining Company*, operator, has exposed a ledge of gold ore in its new 200-foot level. Development work has been in virgin ground below old workings for a length of about 500 feet. Ed Hansen is superintendent and Harold Haven of Grass Valley is in charge of underground work.

George W. Snyder, Sr., of Salt Lake City, Utah, will start development work at the *Merrimac* mine soon in the Silver Canyon Mining district, Elko County, Nevada. He holds a lease and option-to-buy on the mine from the *Union Chief Mining Company* of Salt Lake City. The property consists of nine unpatented copper mining claims.

Winnemucca Mountain Mines Company is completing mill construction at its property at Winnemucca, Nevada, according to Gus Rogers, manager. The mill is being built in two 50-ton units and will have amalgamation with a table concentrator and flotation for gold-silver ores, and provision has been made for conversion to treatment of copper, lead and zinc, if necessary. Mining will be both underground and openpit. Development of gold showings during the past year has proved a large tonnage available for milling. The company also will continue to explore and develop oxidized copper deposits in the eastern section of its property.

A daily production of 40 tons of tungsten ore from the *Black Horse* mine west of Coaldale in the Goldfield mining district, Nevada, is being trucked to the Pine Creek plant of *U. S. Vanadium Company*, Bishop, California. Mining is by openpit methods and Don Burgner of Reno, lessee, expects to install a compressor and wagon drills soon at the property and to intensify development. About 11,000 cubic yards of overburden have been bulldozed from the 16 to 30-foot wide orebody. Burgner, incidentally, is reported to have sold four mining claims in the Potosi mining district to Dennis Hill of Reno. The claims were the *Toby Lode*, *Toby No. 1*, *Valley View* and *Valley View Fraction*.

The highgrade gold strike made recently in a raise on the 10th level in the *Jumbo Extension* mine at Goldfield, Nevada, may extend to considerable depth, officials say. At present the orebody averages five to six feet wide. The raise is being driven upward to connect with the 9th level and intermediate drifts both north and south have been started.

As far as *Newmont Mining Corporation's* Nevada activities are concerned, the *Deep Mines Operation* at Goldfield will suspend operations soon because of the unfortunate lack of success in finding new orebodies during extensive underground work in effect for several years. The last major discovery of gold in the mine was made in the White Horse shaft in 1947. However, the corporation is investigating several strategic-metal properties in Nevada and thus may continue mining in this state.

The shaft being sunk by Joe Burgess and William Hammond of Tonopah on the *Lena* claim at Goldfield, Nevada, is

now down about 40 feet and the men plan to install a hoist and small headframe, and continue to sink to deeper levels. They are exploring ground west of the Columbia Mountain fault, 500 feet west of the White Horse shaft of the Newmont Mining Corporation.

About 420-tons of gold ore daily are being produced from the *Goldacres* mine at Beowawe, in the Tenabo district of Nevada. A new water well was completed recently by the operating company, *London Extension Mining Company*, 704 U. S. National Bank Building, Denver, Colorado, according to Harry Bishop, official of the company.

NEW MEXICO

Citizens of Hidalgo County, headed by Mrs. Merle Horzmann, of *Colonial Enterprises*, Lordsburg, New Mexico, are combining their efforts to obtain a custom ore mill with a capacity of about 300 tons per day to enable small mine owners and operators in the area to handle the low grade deposits on a commercial basis. There are more than a hundred such mines now idle because of the high cost of production and shipping. A survey is being made of all available tonnage in that area. The mill, as envisioned, would involve approximately $300,000 and would handle all basic metals, as well as other strategic metals for use in the war effort, and would add materially to the stockpiling. A millsite has been promised gratis, close to Lordsburg, with all facilities available. The *McGhee* mill, already equipped, 26 miles west of Lordsburg, could be put into operation with an expenditure, according to Donald A. McGhee, owner, of $2,500 to $3,000, which he is contemplating doing on his own. This mill is powered for 75 tons daily and last operated in 1948. Besides this project, the townspeople of Hatch have a similar idea. They want a custom mill to stimulate production from nearby lead, barite and fluorspar deposits and deposits containing all three.

The New Mexico State Senate has passed, and the Governor has signed, a "mining" bill that will make the state severance tax apply to the first $200,000 worth of production, now exempt. The tax on the defined "gross value" of production would be, for potash, oil, and natural gas, 2.5 percent; for copper, 0.5 percent; coal, gold, lead, silver, zinc, molybdenum, manganese, fluorspar, uranium, pumice, and langbeinite, ⅛ percent. These percentages are the same as at present except for the first time ⅛ percent applies to an itemized list, thus excluding perlite, sand, and gravel from the tax.

Bob Mathis of Silver City, New Mexico, is shipping about 200 tons of iron ore each day from his operation to *The Colorado Fuel & Iron Corporation* at Pueblo.

Mining Engineer Alva H. Gunnell of Albuquerque, New Mexico, comments that if prices hold, the development of tin deposits in the Black Range country of Catron and Sierra counties is very likely. He says the deposits are scattered, suitable for development by a few men, and are the placer type of limited yardage.

The *Petaca Minerals Corporation of New Mexico* has a contract with the De Anza Engineering Company of San Francisco to build a new mica-flour mill and beryl recovery plant in northern New Mexico, and primary construction is said to be planned for June. The corporation holds 20 claims in one block in the Cribbensville zone of the Petaca mining district, Rio Arriba County. The area is well known for its rich pegmatite zones, which have been described in bulletins by the U. S. Bureau of Mines, the Geological Survey, New Mexico School of Mines and California Institute of Technology.

The *Copper Hill Mining Company*, formed recently by some southeastern New Mexico mining men, is prospecting its new leasehold in the Zuni Mountain area some 25 miles from Grants, to study potential commercial development of copper ore deposits there. Recent estimates that a large tonnage of fairly good grade ore exists reportedly have been made. The product would be shipped by train to the American Smelting & Refining Company in El Paso, Texas.

The *Kennecott Copper Corporation's Chino Mines Division*, New Mexico, faced with the possibility of cutting production if water is not available, has begun a water development program it hopes to complete by June. A pipeline, 14 inches in diameter, is being built to the Hurley smelter to carry water from Warm Springs, some 12 miles to the south. The pipeline will extend eight and a half miles from Warm Springs to a pumping station, from which water will flow through existing lines to the smelter.

precipitates—ROCKY MOUNTAIN

Higher Price, New Bonus Announced for Uranium

The U. S. Atomic Energy Commission is paying a new price for uranium and a bonus for the first 10,000 pounds of U_3O_8 from "new and certain existing properties." The new schedule was effective March 1, 1951, and extends to March 1, 1954. The prices were raised shortly after the Independent Uranium-Vanadium Ore Producers Association had called attention to the need for an increased price if many small producers were to continue production, and after passage of the resolution at the Colorado Mining Association's 54th convention asking that "prices . . . of uranium ores be raised to meet increased costs of production."

Significant differences between the old and new schedule have been announced by Frank H. MacPherson, manager, Colorado Raw Materials Operations, U. S. Atomic Energy Commission as follows:

During the past the uranium miner has been getting his pay in several ways. He has been given a basic rate per pound of uranium content. This rate ranged from 50 cents per pound for low grade, 0.10 percent ore (contains only two pounds per ton) to a maximum of $2.00 for 0.20 percent ore (only four pounds per ton). This rate has been hiked, the new scale ranging from $1.50 per pound for the 0.10 percent ore to the $3.50 for the 0.20 percent ore.

In the past the miner has been given a premium of 25 cents per ton for each pound of uranium per ton over four pounds. This has been hiked to 75 cents per pound.

Under the old schedule the miner was given an extra 25 cents per ton for each pound over 10 pounds per ton. This schedule has not been changed.

Miners also have been paid an extra 50 cents per pound development allowance on all ore sold. This rate has not been changed.

Miners or truckers have been getting a haulage allowance of six cents per ton mile up to 100 miles and this has not been changed.

Miners also are being paid 31 cents per pound for vanadium content up to 10 pounds per ton, maximum. This is unchanged by the new order.

If miners deliver ore with over 10 pounds per ton vanadium they forfeit any amount over the 10 pounds.

If miners deliver any ore with less than 0.10 percent uranium (two pounds per ton) they get no pay and the ore is taken to pay for handling.

In the past the Colorado Plateau uranium miner has not been eligible for any bonus. AEC has long had a $10,000 bonus offer, still unclaimed, for the discovery of new orebodies which will produce up to 40,000 pounds of very highgrade ore. The Colorado Plateau was excluded from this offer.

Now for the first time Colorado Plateau miners are eligible for a bonus and some existing mines can qualify.

For mining properties now operating which have produced less than 10,000 pounds of uranium oxide since April 9, 1948, bonus payments will be made on the difference between what the mining property has produced to date and 10,000 pounds.

The bonus is easy to figure. If uranium ore sells for $15,000, basic price, the bonus to be paid by AEC and not by the receiving station or mill, will be $15,000. The old $10,000 bonus was for 20 percent grade ore and none has been found.

BASIC URANIUM PAYMENTS FOR LOW GRADE ORE UNDER SCHEDULES BEFORE AND AFTER MARCH 1, 1951.

Percent U_3O_8	*Pounds U_3O_8 Per Ton*	*Former Payment Schedule Per Lb.*	*New Payment Schedule Per Lb.*
Under 0.10	...	$0.0	$0.0
0.10	2.0	0.50	1.50
0.11	2.2	0.70	1.70
0.12	2.4	0.90	1.90
0.13	2.6	1.10	2.10
0.14	2.8	1.30	2.30
0.15	3.0	1.50	2.50
0.16	3.2	1.60	2.70
0.17	3.4	1.70	2.90
0.18	3.6	1.80	3.10
0.19	3.8	1.90	3.30
0.20 and up	4.0	2.00	3.50

Climax Uranium Starting Shipments From New Mines

The Climax Uranium Company has started shipments of uranium-vanadium ore from its newly developed mines in the Calamity Mesa district, Mesa County, Colorado. The ore is trucked to the company's new 150-ton-per-day processing plant at Grand Junction.

Joe Weston, Grand Junction, is superintendent of uranium mines for Climax and directs operations at Mexican Hat, Utah, as well as at Calamity. Ernest Blair is mine foreman at Calamity.

Loading and underground tramming is completely Dieselized at both mines. At Calamity ore is hoisted to the surface in six-ton side-dump skips. The skips

LEADVILLE TUNNEL ADVANCED THROUGH BADLY SHATTERED QUARTZITE

Miners employed by the Utah Construction company are placing breast boards at the face of the Leadville, Colorado, drainage tunnel, some 7,600 feet from the portal. Utah Construction is advancing the tunnel under a contractual arrangement with the U. S. Bureau of Mines. Work has been slowed by the badly faulted and highly shattered character of the Sawatch quartzite encountered in tunnelling. Note the 4 by 6 inch back-and-rib spilling on the right side of the tunnel and the breast boards at the face. Fortunately no water was draining into this section of the tunnel but more than 1,600 gallons per minute continues to flow into other sections of the tunnel. The tunnel cross-section pictured here is 7 by 9 feet and timbered with six-piece Douglas-fir sets. Charles E. Matthews supervises Utah Construction work under the direction of William H. King, mining engineer for the Bureau.

U. S. Bureau of Mines Photograph

dump directly onto a stockpile, from which the ore is loaded into trucks by tractor-mounted loaders. Forced ventilation of underground workings is through 12-inch diameter churn-drill holes with electrically powered blowers on the surface.

COLORADO

The *Molybdenum Corporation of America* has a crew of men reconditioning, repairing and remodeling its *Urad* molybdenum mill in Clear Creek County, Colorado. The corporation has transferred some of the men from its *Questa*, Taos County, New Mexico, molybdenum mine and mill to do this work. No official announcement has been made that Molybdenum Corporation will reopen the Urad mine, but advices from Washington indicate that the Federal government is negotiating with the company for increased production of molybdenum under a guaranteed-price-floor contract. Orville Whitaker, 920 Equitable Building, Denver, Colorado, is in charge of the Urad.

The 1,000-ton-per-day Carlton custom gold mill of the *Golden Cycle Corporation* was formally dedicated by Lowell Thomas at 2:30 p.m., March 12, 1951. The new mill, the nation's largest custom gold mill, is located at Elkton, midway between Cripple Creek and Victor and a short downhill truck haul from the major mines. Thomas, a former resident of Victor and an internationally known commentator, broadcast the dedication over the Columbia Broadcasting System.

On February 5, 1951, Donald H. McLaughlin, president, *Homestake Mining Company*, announced that Homestake had acquired approximately 10 percent interest in the *Idarado Mining Company* and a 20 percent interest in the *Atlas Mining Company*, both controlled by the *Newmont Mining Corporation*. Idarado is operating the *Treasury Tunnel* and *Black Bear* mine in Ouray and San Miguel Counties, Colorado, and is producing about 22,000 tons per month of gold-lead-zinc-copper-silver ore. A deep development program, now in progress, will determine the ore possibilities at Atlas.

UTAH

The *Vanadium Corporation of America* is installing a sampling plant at its White Canyon copper-uranium mill near Hite, San Juan County, Utah. The I. Sander Trucking Company of Salt Lake City has signed a contract with Arth Chaffin for ferrying loaded trucks of mill supplies across the Colorado River. Chaffin will increase the capacity of the ferry to 15 tons to take care of the increasing shipments of fuel oil, gasoline, sodium phosphate, and sulphuric acid necessary for the increased rate of milling. Forty men are employed at the mill under the direction of LeRoy Parker of White Canyon. D. W. Viles, vice president in charge of mining for VCA, is in charge of the corporation's uranium-vanadium mining and milling operations.

The *U. S. Atomic Energy Commission* has plans for a mine-access road program throughout the Colorado Plateau area. The Commission is interested in these roads so that the miners will be able to truck their ores to mills. One of the road projects investigated by the AEC is the possible erection of a 220-foot long bridge across the San Juan River at Mexican Hat, San Juan County, Utah, which would permit heavy trucks to haul from the Navajo Indian Reservation north to the AEC's Monticello, Utah, mill. Another road would be built out of the White Canyon district along the south side of Elk mountain, and a third road would be built from Green River to the Temple and Henry Mountains in Emery and Garfield Counties to afford access to the uranium deposits of that area.

The *Park Utah Consolidated Mines Company* produced 38,231 tons of zinc-lead-silver-gold-copper ore at its *Judge* and *Keetley* units in the Park City district during 1950. In the *Ontario* section of the mine, a new shaft is being raised from the 1700 to the 1500 (drain tunnel level) and sinking to the 1950 level is underway. Development of the *Silver King Coalition*-Park Utah Consolidated joint-block has disclosed two narrow veins of good ore. In the Judge area exploration is continuing to the west of the old Judge workings. Paul H. Hunt, Salt Lake City, Utah, is vice president and general manager.

The *Royston Mining Company* is sinking an inclined shaft on the *Lucky Strike* group of claims in the Marysvale, Utah, mining district. R. A. Glenny, Salt Lake City, is secretary.

A well-organized prospecting party left Hite, Utah, on February 27th, to prospect the region between Hite and Lee's Ferry, Arizona, for uranium. The four-man party, Deloy Shumway, Junior Cosby and Eugene Shumway, uranium miners, and Don Smith, Colorado River boatman, traveled down the Colorado River in four rubber boats. Prospecting will be done along both sides of the river, and, if enough ore is found, a tentative truck road will be surveyed. The men's progress will be checked from airplanes, and supplies will be dropped if necessary. After the party reaches Lee's Ferry the boats will be trucked back to Hite and the prospectors will be flown back.

The *Utah Construction Company* has completed the building to house the *Howe Sound Company's* cobalt refinery at Garfield, Utah. The refinery building is 100 feet wide, 129 feet long and 42 feet high. It is built of steel, covered with corrugated iron, and will process cobalt concentrate from the *Calera Mining Company's* Cobalt, Idaho, flotation mill. Calera is a wholly owned subsidiary of Howe Sound Company.

The *Union Chief Mining Company* has announced plans for an engineer's examination of the company's 123 acres of mining claims in the Santaquin mining district of Utah County, according to Samuel Bernstein, 404 Boston Building, Salt Lake City, Union Chief president.

precipitates—NORTHWEST

Anaconda Buys Bonanza, Options Gold King

Anaconda Copper Mining Company has bought the Bonanza mine and mill near Colville, Washington, from Bonanza Lead, a partnership between Earle B. Gibbs and Ira M. Hunley. Alex M. McDonald, head of ACM Co.'s western exploration department, concluded the agreement.

Located in 1883, the Bonanza mine had produced only $40,000 until 1944, but from 1944 to date, under management by Gibbs with financing by Hunley, the mine produced $2,000,000 worth of lead ore, and became, in 1950, the No. 3 Washington producer of lead.

E. C. Stephens, Anaconda geologist, is now in charge of the Bonanza.

In a separate negotiation, Anaconda acquired an option to the Gold King mine at Bossburg, on the outskirts of Wenatchee, from Lovitt Mining Company. Lovitt had consolidated the Gold King holdings in the last two years by acquiring the rights of J. J. Keegan and the Keegan Mining Company.

The Gold King and associated Macbeath properties rose in 1950 to the No. 2 gold producer in Washington. The ore is highly siliceous in a sedimentary deposit called a reef. The north end of the gold-bearing reef is owned by Keegan Mining Company, which also negotiated an option to sell to Anaconda.

Washington's Last Chance Mine to be Reopened

Intensive development and mining will be started soon by the Last Chance Consolidated Mines, Inc., at its properties in the Northport mining district of Stevens County, Washington. The company owns the Last Chance, Great Western and Black Rock mines.

Development plans include the installation of a second ball mill at the Last Chance mine and installation of further milling equipment in the existing 60-ton gravity flotation mill to bring total capacity to more than 100 tons daily; the installation of a 1,200-foot tramway, which will carry ore from the Last Chance mine's main haulage level to the mill, at an elevation 500 feet below, and which will eliminate a long truck route; driving the 1,200-foot No. 4 tunnel 600 feet from the Last Chance to the Great Western orebody at a depth 500 feet below present workings; and equipping the Black Rock mine with additional equipment, including a hoist.

According to Roy Magney of Spokane, a director of the company, milling grade zinc-lead ore is available for mining now in the Last Chance mine.

The Last Chance was operated by Picher Lead Company from 1902 to 1910; then by Jupiter Lead Company of Spokane; and then, in 1942, was acquired by Last Chance Consolidated. The mill was installed in 1948 and some concentrates shipped that year. The last shipment of concentrates went out from the property in 1949. The Black Rock has been developed by shaft workings to a depth of 900 feet and up to 1930 had yielded about $300,000 worth of lead-zinc ore; the Great Western has yielded about $60,000 worth.

Day Mines, Inc., is completing negotiations to acquire under lease and option the *Independence Lead Mines'* holdings consisting of 15 patented and 16 unpatented claims northwest of Mullan, Idaho, and has already bought the *Gold Hunter Mines, Inc.'s* mill and 12 patented claims, four patented mill sites and the 100-acre Hunter homestead, all adjoining Independence land. The *Federal Mining and Smelting Company* will be involved in the exploration program Day Mines plans for the properties as Federal's *Morning* mine shaft will be used as a base for deep level work. The Independence lease is for 30 years with a 30-year renewal option attached. Day said a minimum expenditure of $300,000, with work to start in 90 days after ratification by Independence directors and stockholders, was a part of the contract terms. The workings in the Independence mines consist of 18,000 feet of tunnels. The Gold Hunter mine's main shaft extends to the 1,200-foot level and a winze on a separate vein system extends 600 feet further in depth. The production record of this property is said to be $25,000,000 worth of lead and silver. A complete surface plant with a 500-ton flotation concentrator is part of the Gold Hunter equipment.

Lookout Mountain Mining & Milling Company is resuming development of its 740-acre Pine Creek, Idaho, property as a result of recommendations by Stephen W. Zoldok, mining engineer, who has completed geological examination of the property. The mine, a lead producer, has several short adits, two long crosscuts, and two shallow winzes in upper levels, and a main working tunnel at a lower depth with 6,150 feet of laterals and about 1,150 feet of backs. This tunnel joins *Sunset Mineral's* underground workings for ventilation purposes. The recommended work to be done is to sink a 225-foot winze 25 feet further where a brecciated zone formed by an east-west fault should intersect the Lookout vein.

IDAHO BERYLLIUM & MICA CORPORATION INSTALLS MILL NEAR TROY

Nearing completion is the new mill and processing plant of the Idaho Beryllium and Mica Corporation, which owns the Muscovite and Lawrence patented mining claims and other properties on Mica Mountain, in the Avon mining district, northeast of Troy, Latah County, Idaho. The company is said to have planned a program calling for the expenditure of $1,500,000 in properties, mills and processing plants in Latah County in the next two years. The new 50-ton plant will ship one carload of wet-ground mica flour per day and about a car of beryl powder and other rare-earth-mineral concentrates per week. The Construction Division of the De Anza Engineering Company is building the plant. This firm has field offices at Troy and headquarters at 420 Market Street, San Francisco, and manufactures the De Anza Spinning Mills. Allen White is president. Officers of the Idaho Beryllium firm are C. V. Peckham, chairman; H. G. Peckham, president; Lawrence Smith, secretary; John Carver Jr., Washington representative and legal adviser; and others.

Zoldok thinks that large lead-zinc orebodies should be found in this structure.

Otto M. Nordquist, president and general manager of the *Ione Mining Company*, says that the company hopes to start mining this month if present promising weather conditions persist. The mine is east of Murray, Idaho, at fairly high elevation; development work last year could be carried on only from June to November. At that time 530 feet of crosscutting was done and only 70 feet more is estimated to be necessary before the vein is cut in the new lower adit. In the No. 1, upper adit, a lead-silver vein has been opened.

A new firm, the *Hometown Mining Company*, has been organized to obtain the mineral rights under the city of Mullan, Idaho. The company was organized by Piatt Hull, C. W. Bentley and Walter Almquist and is capitalized for $500,000. Bentley is president of *Lucky Friday Extension Mining Company*.

Exploration of the *Clark* group of eight claims is planned by the *Galena Mining and Milling Company*. The claims are on the east fork of Idaho's Pine Creek, between the *Douglas* and *Spokane-Idaho* mines. According to Geoffrey L. Clark, president, the company's development funds have been obtained by the sale of the *Galena Farm* mine in British Columbia to *Van Roi Consolidated Mines, Ltd.*

The *San Francisco Chemical Company* plans to start producing phosphate from its *Waterloo* mine in Montpelier Canyon, Idaho, about the first of May, according to D. L. King, president and general manager. The mill at the Montpelier railhead is to be re-equipped with new crushing machinery and should be ready to operate in late fall.

Two contracts from the General Services Administration for cobalt have been received by the *Calera Mining Company*, which operates the *Blackbird* mine near Salmon, Idaho. The first contract calls for delivery to the government of 2,000,000 pounds of cobalt between July 1, 1951, and June 30, 1952. The second contract calls for purchase of 10,000,000 pounds of cobalt during the five-year period beginning on July 1, 1952. An access road will soon be built from U.S. Highway 93 to the mine by means of Federal aid; the company's new 600-ton flotation mill should begin operating within a few weeks.

Development of *Silver Buckle Mining Company's* property in the Coeur d'Alene district of Idaho will be done by the *American Smelting & Refining Company*, which has optioned 6,700,000 shares of Silver Buckle's common stock. If AS&R picks up the option, it will hold the surface rights to 155 acres of Silver Buckle land, an easement for a shaft and underground work, and part of a homestead. Dr. F. E. Scott, president, said AS&R will do detailed geological work and that *Day Mines* might join in the exploration phase of the project, paying about a quarter of the expenses.

J. C. Kieffer, mine manager, *Spokane-Idaho Mining Company*, Wallace, Idaho, advises that the orebody in the *Constitution* mine on upper Pine Creek has been intersected on the new 1,600-foot level and that 100 feet of drifting has been done so far.

At its meeting on March 2 at Ketchum, Idaho, the Idaho Small Mine Operators and Prospectors Association reported a record attendance of 385 men, among them 18 members of the Idaho State Legislature and other state officials. Former Idaho Governor C. A. Bottolfsen was the main speaker. Floyd Sherry, vice president of the association, Mackay, Idaho, was also a speaker. The meeting was arranged by Rex Shirts, Hailey, president, and W. R. New, Hailey, secretary of the association.

Northwest Gypsum Company expects to begin mining operations soon at its gypsum deposit at the mouth of Rock Creek near Weiser, Idaho, where company officials estimate there are at least 1,000,000 tons of the mineral. Work through the winter has resulted in the near completion of a $105,000 company road to the Union Pacific Railroad at Huntington Bridge. Mining of the gypsum involves stripping of over-burden and drilling and blasting of the face, allowing for openpit operations for some time to come.

Hypotheek Mining and Milling Company is extending the east face of the 900 level in its mine to the southeast toward the expected downward extension of an ore showing uncovered by surface bulldozing. The company recently installed a new drifter, two mine cars and other drifting equipment. The mine is in French Gulch, west of Pine Creek, Idaho.

Nabob Silver-Lead Company, Wallace, Idaho, has driven the west drift on the Crystalite vein about 800 feet. Ore stringers have been followed most of this distance, and milling of this development rock is partially defraying cost of development. A three-compartment working raise has been completed 90 feet above the main tunnel level on the Crystalite vein, a station cut at that level, and 60 feet of drifting done from the station on the 90-foot level. The drift has now crosscut about 20 feet of what is hoped to be milling grade ore, and the

vein with ore continues in the face of the drift, which is now cutting the vein at about right angles. The company has bought the Shetland group of four claims, the Jumbo group of three unpatented claims and located eight more claims in the district recently.

Fire recently destroyed the main bin and headframe at the *Washington Idaho* mine, *Idaho Mining Co.*, Kellogg, Idaho, but, according to Bruce E. Allgaier, resident manager, reconstruction is under way and new equipment being brought in. Damage was estimated at $7,000. The company began working the property January 15, unwatered the shaft and pulled the main pump for repairs; a temporary motor pump had been set up and a 440-volt wire to it is suspected to have overheated and caused the fire.

A seven-mile power line, an access road, building of a mill, and a 2000-foot access tunnel are projects being completed by the *Goldstone Mining Company*, Salmon, Idaho. A former producer, the mine is being developed today on a long-term program which should result in a low-cost operation and open a much greater ore reserve than formerly indicated. Mill and mining machinery was recently purchased, and plans call for the mill building to be erected this spring, and the machinery installed. Mining operations themselves will begin early in the fall, after completion of the adit to tap the orebody and make available reserves already blocked out.

Gibbonsville Mining and Exploration Company is reported to have announced plans for an early operation involving the working of zinc-lead tailings near Smelterville, Idaho.

Idaho silver production in 1950 was 22 percent higher than in 1949 according to a Bureau of Mines report. Output was said to be 16,250,000 fine ounces. The state with the next highest output was Utah with 7,023,500 ounces.

MONTANA

A permanent chrome operation may be set up by the *Chromium Mining and Smelting Corporation* at Glendive, Montana, Leo H. Timmins, president, has announced. The corporation is considering the installation of a two-furnace smelter to treat low grade chromite ores in the area; production would be about 2,000 tons a month; and cost of facilities would be around $1,500,000. About 15,000 kilowatts of power would be used. During the war Chromium Mining treated 30,000 tons of Montana ore at its Sault Sainte Marie, Ontario, smelter.

Development work at *Nancy Lee Mines, Inc.'s* Superior, Montana, property is having results and the 2,300-foot lower tunnel is now entering an ore zone, C. R. Ranney, engineer, advises. The zone has been successfully mined above, and similar formations are being encountered in the lower tunnel.

Announcements concerning *Harvey Machine Company's* plan to build a new aluminum plant at Kalispell, Montana, say that production of 72,000 tons per year will be possible by the middle of 1952.

OREGON

The *U. S. Bureau of Mines* at Albany, Oregon, which already has two zirconium plants in operation, is starting construction of a plant to manufacture zirconium tetrachloride at a cost of $90,000, according to S. M. Shelton, regional director. Zirconium tetrachloride is an intermediate product in zirconium metal production. The plant will be built and operated by the Bureau's *Northwest Electro-Development Laboratory* and is scheduled for operation in about 60 days. The completion of this plant will bring the Bureau's total plant investment at Albany to $530,000.

James Orr of Scappoose, Oregon, is building a new plant to replace his existing pilot plant to treat limonite. His mine is about two miles from Scappoose. The extra grinding capacity of the new plant will be used in other work.

WASHINGTON

Operations have been resumed by *Germania Consolidated Mines, Inc.*, of Spokane at its Stevens County tungsten property west of Springdale, Washington. The last shipment was made in 1946 and development ceased in 1949, but present tungsten prices have made operations feasible again, according to E. I. Fisher, secretary-treasurer. Germania Consolidated owns the *Norton* and *Keith* properties adjoining the well known *Germania* mine. The company plans to clean out a cavein which blocks the No. 2 vein and expects to ship its first load of concentrates about May 1st. The property is equipped with a mill, bunkhouse, compressor house and machine shop. H. W. Traver of Springdale will be in charge of operations. Directors are Julius A. Franz, also president; Henry J. Franz, vice president; Fisher; Bartley O. Myron; and H. G. Loop, managing director.

According to Senator Magnuson of Washington, the *Eastern Metal Products Company*, Tuckahoe, New York, is considering Vancouver, Longview, Tacoma, Bellingham and Everett as possible sites for an aluminum plant which will include a bauxite reduction unit, aluminum production and fabrication units, and four potlines. The company is said to have obtained permission to use 110,000 kilowatts of power from the Bonneville Power Administration.

F. W. Mathias, manager of the Olympia Chamber of Commerce, and representatives of the Tacoma Chamber of Commerce are attempting to interest mining firms in reopening manganese properties on the Olympic peninsula. During the war several companies, including the *Sunshine Mining Company* of Idaho, operated in the area.

precipitates—CENTRAL and EASTERN

Lake Superior Engineers To Hold Symposiums

Two mining symposiums will be held at Hibbing, Minnesota, in April, for engineers and operators of the Lake Superior area. The first, on April 5th, will be under the special sponsorship of the Arrowhead chapter of the Minnesota Society of Professional Engineers. It will deal with the geological survey and exploratory work done in the area.

The second symposium, to be held on April 6th, will dwell on drilling problems, with particular emphasis on core recovery. With the increasing proportion of lowgrade ores and the greater interest being taken in taconite, this subject is becoming continually more important.

PROFESSOR T. L. JOSEPH has been elected chairman of the Iron and Steel Division of the AIME. He also is chairman of the Technical Division and thus automatically has become a member of the Institute's board of directors. He is assistant dean at the University of Minnesota, Institute of Technology and has immediate supervision of the School of Mines and Metallurgy.

Inland's Cayia Mine to Produce in Late 1952

Ore shipments from the Inland Steel Company's new Cayia mine, Crystal Falls, Michigan, may possibly start late in 1952, even though difficulty is being experienced in obtaining equipment because of world conditions.

The Cayia is located about two and a half miles from existing rail and power lines. Ore from the mine will be shipped via C&NW RR to the ore docks at Escanaba for transfer to lake boats. Eventual production of 200,000 tons yearly is contemplated. The orebody at the Cayia, which has been diamond-drilled, is highly phosphorous, and, in this, similar to other ores of the Menominee Range; however, here the similarity ceases, for in appearance, the test samples seem more related to the ores of the Marquette Range.

CENTRAL STATES

Scrap zinc has been put under control by the government, but officials of the Tri-State mining district do not believe that this restriction will have any effect on the zinc production of the district, or of metal produced from Tri-State ores. Only a very small quantity of zinc scrap is collected in this area.

A Minneapolis chemical firm has offered to buy the iron powder plant at Aurora, Minnesota, which has been idle for some time. Some members of the state legislature from northern Minnesota will ask that the legislature allow the Iron Range Resources and Rehabilitation Commission to dispose of the property. The chemical company reportedly would use the plant to process Cuyuna range manganese ores.

EASTERN STATES

Jones & Laughlin Ore Company will accomplish an expansion of 30 percent in capacity—from 1,000,000 to 1,300,000 tons—at its *Benson Mines*, Star Lake, New York, in 1952. At present the company is crushing ore to minus-20-mesh and removing the magnetic portion by means of electric separators. A plus-60-percent concentrate is produced and then is sintered and shipped. When expansion installations are operating, the non-magnetic portion of the ore will be sent to a bank of 160 Humphrey spirals which will produce a non-magnetic concentrate. This will be sintered and shipped. A further expansion to 1,800,000 tons annually will be completed by 1954.

The diamond mines near Murphreesboro, Arkansas, have been opened to the public, reportedly the first time any diamond mine in the world has been opened to the public. Owners of the company, the *Diamond Preserve of the United States, Inc.*, are Talbot Field, Jr., of Hope, Arkansas, attorney and geologist; Robert Dale Plant and Henry K. Holland, both of Murphreesboro. The mine is in an ancient volcanic crater in which diamonds were discovered in 1906. Since then an estimated 48,000 diamonds have been taken from the deposits, mostly industrial, but some of them of gem quality.

The Government has reactivated three magnesium plants it owns, one at Painesville, Ohio, a second at Canaan, Connecticut, and the third at Wingdale, New York. During the next two years the plants will turn out an estimated 112,000,000 pounds of magneisum for the national stockpile. The Painesville plant will be run by the *Diamond Magnesium Corporation*, and the Canaan and Wingdale plants by *Nelco Metals, Inc.*

On March 1, the *United States Steel Company* held ground-breaking ceremonies marking the beginning of the company's new *Fairless Works* project near Morrisville, Pennsylvania, on the Delaware River. The mill will have an annual capacity of 1,800,000 tons of raw steel. The Wilputte Division of the Allied Chemical and Dye Corporation will design and build two batteries of 87 coke ovens each for the mill and the Koppers Company, Inc., will engineer and build the nine open-hearth furnaces.

IRON RANGES

The first conveyor flight that is being constructed north from the shaft head of the *Mather B* mine, operated by the *Cleveland Cliffs Iron Company*, Negaunee, Michigan, is nearing completion. The trestle carries a 36-inch belt on 655-foot, 5-inch centers and will operate at 400 fpm. This main conveyor will have a movable tripper installed to transfer ore to the mid-point of two east-west stacker conveyors. The company reports that the first of these two stacker belts should be completed by this summer or early fall. The two stacker conveyors will operate on a trestle supported by tubular columns that will be buried by the ore as winter operations progress. Production has not reached its peak at either *Mather A* or *Mather B* and is still on the increase from month to month. Latest obtainable figures on production at both shafts is 135,000 tons in January, 1951.

Stripping is underway at the *Jessie H. Mining Company's* Jessie mine northeast of Grand Rapids, Minnesota, with the work being done by the Hallett Construction Company using a Lima dragline excavator. The Jessie is a new open-pit on the western Mesabi range and will be producing later this year, according to present expectations. Partners in the company are R. N. McGiffert of Duluth, E. W. Hallett and Jessie F. Hallett of Crosby, and J. F. Lorge of St. Peter, Minnesota. The mine was once known as the *Remer Reserve*, and the *Greenway* mine lies just southeast of it.

Reports on the recent activities of the *M. A. Hanna Company* at several mines are as follows: At the *Mesabi Chief* mine plant in Nashwauk Township, Minnesota, changes are being made to prepare for a HMS addition. At the *Keewatin* HMS plant at Keewatin, two new 45-inch Wemco densifiers are to be installed. At the *Douglas* mine, construction work on the washing plant is well under way, the pit screening plant is progressing, and the conveyor gallery has been completed. At the *Morton* mine, a new two-story, 80 by 100-foot steel building, 22 feet high, has been built to house a large truck repair shop, a warehouse, welding shop, electric shop, office, locker and wash rooms. The building has radiant heating, aluminum inside walls and is as nearly fireproof as possible.

As far as *M. A. Hanna Company's* production is concerned, nine mines on the Mesabi Range moved a total of 672,293

cubic yards of rock and 1,695,120 cubic yards of surface overburden during January, and two mines on the Cuyuna moved 336,000 yards of dirt and 56,326 yards of rock. A total of 2,759,739 cubic yards of material was moved at the company's Minnesota mines in January. The *Buckeye* was first with 389,738 cubic yards; then the *Douglas* group, 288,763 cubic yards; and then the *Morton*, 285,675 yards.

Another bulk cargo vessel will be built by Bethlehem-Sparrows Point Shipyard, Inc., for the Interlake Steamship Company for iron ore carrying on the Great Lakes. This ship will be 626 feet long, have a beam of 70 feet, and will cost $6,000,000.

The *Junior Mining Company*, after completing its exploratory drilling, plans to strip the *Haley* mine, located at and under Longyear Lake at Chisholm, Minnesota. The property is a state lease and has been known as the *Longyear Lake Mining Unit No. 1*. A Lima 3½-yard shovel and five 15-ton Euclid trucks will be used at the mine, which will be operated for Junior Mining by A. B. Tomasich, contractor, of Virginia, Minnesota.

Pickands Mather & Company is stripping at eight of its Mesabi range mines: the *Mahoning* and *Albany* at Hibbing, Minnesota; the *Danube-Orwell* at Bovey; the *Bennett* at Keewatin; the *Carmi-Carson* at Carson Lake; the *Wade* at Kinney; the *Biwabik* and *Embarrass* at Biwabik. The company is also stripping at the *Mahnoinen* and *Sagamore* mines on the Cuyuna range.

Stripping at the *Oliver Iron Mining Company's* new *King* mine at Coleraine, Minnesota, will be actively pushed during the winter. Other Oliver stripping operations will include the *Auburn* at Virginia; the *Kosmerl* at Buhl (a new mine), and the *Knox* and *Burns* at Aurora. The company is installing two 72-inch diameter Wemco SH classifiers in the washing circuit of the *Hull Rust* concentrator, Hibbing.

The Ford Motor Company has contracted for a new 647-foot ore ship which will be built by the Great Lakes Engineering Works. To be completed by 1953, the ship will have a capacity of 19,000 gross tons and will carry coal, limestone and iron ore from northern lake ports to Ford's River Rouge plant for conversion to steel.

PROFESSIONAL DIRECTORY

One-Inch Card, $35 Yearly—½-Inch, $20 Yearly. Payable in Advance.

CONSULTING ENGINEERS:

R. L. GILMORE, E. M.
AND ASSOCIATES — ENGINEERS
Mining—Petroleum—Chemical—Metallurgical
Geological Examinations and Reports
Mine Examinations—Mine Management and Operation—Ore Analysis
GEOPHYSICAL EXPLORATION
6061 State St. Huntington Park, Calif.

HAMMOND-EVERLY ENGINEERING CO.
CONSULTING MINING AND GEOLOGICAL ENGINEERS
Plant Design MINE Examinations
Reports MANAGEMENT Surveys
27 West Granite Street • Butte, Mont.

Consulting Service
J. BRYANT KASEY
Box 968 • Phone 3-0626 • Bakersfield, Calif.
Mining, Milling, Smelting, Refining
Technical Advice to Management
Chemical Problems

MARK LINTZ
Mining and Metallurgical Engineer
Original sampling thru plant and operations. Correctly integrated functional units in plant design. Metallurgical, Non-Metallics and special process problems.
319 Grant Avenue, San Francisco, Cal.

G. G. McDANIEL
Mineral Surveyor (U. S.) Reg'd Civil Eng'r
255 California St. Phone: SU 1-8207
San Francisco, California

CLAYTON T. McNEIL, E. M.
Mine Examination, Reports, Supervision, Operation
822 Bank of America Bldg. Tel. GArfield 1-2948
SAN FRANCISCO 4, CALIFORNIA

ARNOLD H. MILLER
CONSULTING ENGINEER
General Mine, Mill and Industrial Appraisals, Plant Design, Mechanization.
Cable: "ALMIL" Tel. Cortland 7-0635
120 Broadway New York City 5, N. Y.

STANLEY M. MOOS
MACHINERY CONSULTANT
El Paso, Texas—P. O. Box 321
100 Texas St. Tel. 2-6538
CABLE ADDRESS "MOOS"
Mexico, D. F. Apartado 215

MURPHY, F. M.
Consulting Mining Geologist
1201 Maryland Parkway, Las Vegas, Nev.

MILL DESIGN & CONSTRUCTION
Send for Free Bulletin
O. W. WALVOORD CO.
401 High Street • Denver, Colorado

SOUTHWESTERN GEOLOGICAL SERVICE
Alfred D. Wandke Arthur R. Still
Geologic and Engineering Mapping
Prospect Examinations
Microscopical studies of ores and mill products
Box 1512 Prescott, Arizona

CLIFFORD R. WILFLEY
Mining Engineer
Consulting
2233 Grape St. EAst 0398
Denver 7, Colorado

CLYDE H. WILSON
GEOPHYSICAL SURVEYS
Mineral Deposits • Water Supply
Oil Field Structure
WILSON EXPLORATION COMPANY
Los Angeles Salt Lake City
1727 Westerly Terrace Walker Bank Building

HARRY J. WOLF
Mining and Consulting Engineer
Examinations—Valuations—Management
420 Madison Ave., New York 17, N. Y.
Cable: MINEWOLF Tel.: PLaza 9-1700

LAWRENCE B. WRIGHT
Consulting Mining Geologist
401-41st Ave. San Francisco 21, Calif.

CHEMISTS, SAMPLERS, SHIPPER'S REP'S:

ARIZ. TESTING LABORATORIES
CLAUDE E. McLEAN, REGISTERED ASSAYER
Analytical and Consulting Chemists
Box 1888 817 W. Madison St. Phoenix

ORE SAMPLERS & SHIPPERS' AGENTS
Beach & Company
Phone 258—P. O. Box 574
131 E. Eighth St., Leadville, Colo.
Branches at Amarillo and Dumas, Texas. All Utah smelters and other places by arrangement. Address all communications to the Leadville office. Oldest, most reliable.
Rates reasonable.

SHIPPERS' REPRESENTATIVES
at Tacoma Smelter for over 35 years
Control and Umpire Assaying
BENNETTS
Chemical Laboratory, Inc.
1131 Market Street • Tacoma 3, Wash.

B. W. DEASON V. E. WORSLEY
BLACK & DEASON
Assayers and Chemists
Ore Shippers Represented at all Smelters
P. O. Box #1888 Salt Lake City, Utah

THE COLORADO ASSAYING CO.
ASSAYERS, CHEMISTS, and SPECTROGRAPHERS
Est. 1900
Charges: Gold 75c, Silver 75c, Copper 75c
Send for Free Copy of Our Mineralogist's Pocket Reference Giving Detailed Information on All the Principal Ores.
2013 WELTON ST., DENVER 1, COLORADO

CUSTOM ASSAY OFFICE and LABORATORY
Commercial and Umpire Assayers
All types of organic and inorganic chemical analysis
Shippers Representatives
105 South Santa Fe, El Paso, Texas
Post Office Box 811 Phone 2-2212

EISENHAUER LABORATORIES
ESTABLISHED 1916
320-322 South San Pedro St., Los Angeles 13, Cal.
L. E. Raymond • Ed. Eisenhauer, Jr.
L. C. Penhoet
Assayers • Chemists • Metallurgists
Ore Tests • Plants Designed
Specialty, Improvement of Plant Recovery & Efficiency

EL PASO TESTING LABORATORIES
Umpire Assayers—Chemists—Metallurgists
Shippers' Representatives
At:
El Paso Smelter—Phelps Dodge Refinery
For Ores and Scrap Metals
P. O. Box 1565, El Paso, Texas

GOODALL BROTHERS
ASSAYERS AND CHEMISTS
SHIPPERS' REPRESENTATIVES
Established 1909
Helena Montana

HANKS, INC., ABBOT A.
ASSAYERS AND CHEMISTS
Supervision of Sampling at Smelters
Spectrographic Analysis
624 Sacramento St. San Francisco 11

HAWLEY & HAWLEY
W. E. HAWLEY, Mgr.
Assayers, Chemists, Ore Buyers
Shippers' Representative
P. O. Box 1060 Douglas, Arizona

HERMAN, JOHN
ASSAYER AND CHEMIST
Qualitative Spectrographic Analysis
I Do Not Guarantee Satisfaction
I Guarantee Accuracy
920 Santee St. Los Angeles 15, Calif.

New Mexico
MINERALS LABORATORY
A. K. Veeder, Mgr.
Control and Umpire Assayers
Shippers' Representatives
1303 Grant Street Silver City, N. M.

ROOT & SIMPSON, INC.
Metallurgical Chemists and Assayers
P. O. Box 2069 Denver 1, Colo.
Established 1902

PHANTOM STAGE COACH

Continued from Page 18

that extended all the way to a small butte about a mile to the east of the station. Half-way there, one of the miners was killed. The other two, together with some of the passengers, managed to reach the butte and from the protection of some low ledges of granite made their last stand.

"During the fight all of the passengers, 12 of the soldiers, the stage driver, Peg-Leg Pete and his two companions, and an undetermined number of Indians were killed. For days the dead bodies lay where they had fallen. Finally, when the officers arrived, it was discovered that the body of the first miner to fall had been almost completely destroyed by the coyotes. Only the head could be found. That was buried in a grave on the south side of the old road near the spot where he was killed. The 12 soldiers were buried in a little plot of level ground across the gulch to the east of the station, while Peg-Leg and his companions were buried on the west side of the station, a short distance from a gulch that comes down from the south. The graves of the dead were marked with large stones."

Uncle Billy's pipe had gone out, and he interrupted his story until he finally got it working satisfactorily. He then related that while he had never seen it himself, he had been told by others that on dark and stormy nights the old stage coach had been seen coming down through Doubtful Pass at breakneck speed just as it did that night so long ago. The bushy-whiskered driver never stopped at the station, but always threw off the mail sack as he passed.

I did not tell Uncle Billy what I had seen and heard the previous night, nor that his account did not tally exactly with the written account. However, it was a good story and the kind I had come far to hear.

Later that afternoon, out along the old road, we found some burned irons where the old coach had overturned. At the near-by ranch house we were shown others that had been picked up and kept as souvenirs.

About a week afterwards, a grave one-half mile to the east of the station yielded the bullet-punctured skull of a white man, and from a pack rat's nest over a deep crevice in the little butte were recovered the badly decayed tops of what had once been two buckskin bags. Whether the pack rat had found them farther down in the crevice, or carried them from somewhere else, no one can say.

Doubtful Pass has been the Mecca for strange characters from many parts of the western world—writers of every description, old-time peace officers, cowmen, prospectors, Indians, and adventurers of every type. Three army officers once came to look for the grave of Peg-Leg Pete. In that grave, so they said, in a small tin can secreted in an auger hole in Pete's wooden leg, was a small map which gave the key to the noted bandit's $70,000 fortune in gold. The cattle had destroyed the headstone that once marked his grave, and they found no trace of it.

Dark and bloody deeds have occurred at Doubtful Pass. It may even be that the deep crevice in the little rock butte a mile to the east of the old Butterfield Stage Station still holds something which could add another chapter to its weird history.

So ends the strange tale of the Phantom Stage Coach of Doubtful Pass. "The mail must go through."

INDEX OF ADVERTISERS

Business Opportunities

QUICKSILVER MINES. Well prospected, plenty of ore. Needs equipment and finances to operate. Will consider sale, lease, or financing. For further information reply Box D-1, MINING WORLD, 121 Second St., San Francisco 5, Calif.

PERLITE MINE. For bond and lease. A very large perlite deposit, not too far from R.R. Address Box 363, Needles, Calif.

FOR SALE

Large group of developed lead-zinc mining property. Open for inspection

P. O. Box 362 **Denver, Colorado**

FOR LEASE. Decoursey Quicksilver Lode Mine located twenty miles north of Crooked Creek, Alaska post office in Kuskokwim area. 1500 flasks of mercury produced during past eight years from ore averaging about 2½ flasks per ton. U. S. Geological Survey publication 110855 estimates reserves of 17,000 flasks in low grade ore. 1000 feet of development tunnel with up to 190 feet of backs unmined ore. Lease terms 6% of gross production plus purchase of mine equipment. Bob Lyman, Crooked Creek, Alaska.

Positions Desired

Available mine manager or superintendent, graduate engineer, 23 years operating experience, married, children, speak and write Spanish, familiar with all types of mechanized mining, construction, labor relations, exploration and proven record for low costs. Reply Box B-3, MINING WORLD, 121 Second St., San Francisco 5, Calif.

Positions Available

REQUIRED FOR SOUTHWEST—Two experienced draftsmen for design and detailing wood and steel structures, foundations, reinforced concrete and other allied work. Pleasant working conditions. Pension and insurance benefits. Personal traveling expenses refunded. Apply by letter with full details, age, education, experience, etc., to American Smelting and Refining Company, 1112 Mills Building, El Paso, Texas.

Equipment For Sale

3864 Ft. New C.P. Electric Air Compressor.
5'x22", 6'x22", 6'x36", 8'x62" and 8'x36" Hardinge Ball Mills.
6'x14' Hardinge Counter Classifier.
443 KVA 2300 V. Worth. Diesel Gen.
4x10, 5x10, 5x12 and 7x16 Rod Mills.
18x36, 24x36 and 42x48 Jaw Crushers.
54x24, 40x15 and 30x16 Crushing Rolls.
15 Eimco & Gardner-Denver Tunnel Shovels.
5x8, 6x6, 7x5, 8x6 and 8x11 Cylindrical Ball Mills.
Dings E3 Wetherill 6 pole, 18" belt, 3 stage high intensity Magnetic Separator.
6'x60' Rotary Kiln.
Oliver Continuous Filters 8'x12', 11'6"x14'
8' x 4' Dorreo Continuous Filters.
8'6" x 6 disc American Filters.
1250 KVA Nordberg 2300 V. Diesel.
1090 Ft. Elec. WN114 compressor.

DARIEN, 60 E. 42nd Street, New York, N. Y.

BUSINESS MEN'S CLEARING HOUSE

Established 1903

47 Years of Service to Employer and Employee in the Technical Field
File Your Application with Us
No Registration Fee

20 ARCH. ENGR. DRAFTS'N Out	OPEN
2 MILL SUPTS., Fgn	OPEN
JR. METALLURGIST, Fgn.	OPEN
ASST. MILL SUPT., Fgn.	OPEN
CHIEF ENGR. MINE, Fgn.	Room & $450
CHIEF ENGR. MINE, Fgn.	R & B & 350
JR. MINING ENGR., Out	OPEN
JR. METALLURGIST, Out	OPEN
WAREHOUSEMAN, Out	OPEN
DESIGNER DRAFTSMAN, Out	OPEN
MILL & SMELTER DESIGNER, Reinforced Concrete, struc. steel, out	425+
CHIEF ELECTRIC, Fgn.	400
MINING ENGINEER TRAINEE	275
MILL ENGR. TRAINEE	275
JR. ENGR. DRAFTSMAN, Out	OPEN
STRUC. STEEL & CONCRETE DRAFT.	OPEN
CONCRETE & STRUC. STEEL DESIGNERS	OPEN
MINING ENG. 38-45, Out	OPEN
ASST. QUARRY SUPTS. Out	OPEN

601 Midland Savings Bldg.
Denver 2, Colorado

FEDERAL PIPE & TANK CO.

—WOOD PIPE and WOOD TANKS—

Factory and Main Office
6851 E. Marginal Way
Seattle 8, Wash.

CLASSIFIED SECTION

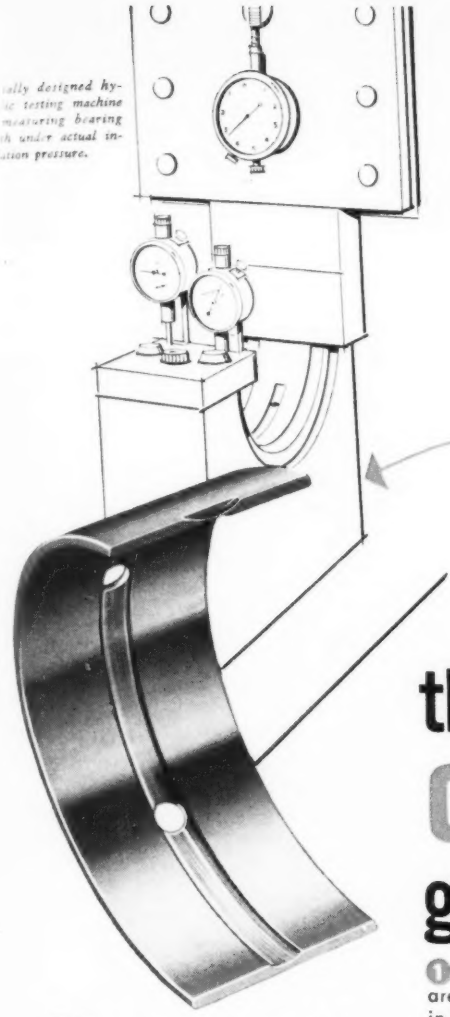
8 pt. type 12c per word. 10 pt. type 18c per word. Minimum charge $4.50.

(For Box numbers addressed to Mining World, add 50c)

Boxed ads (display) in either Market Place or Classified Sections—$6.50 per column inch.

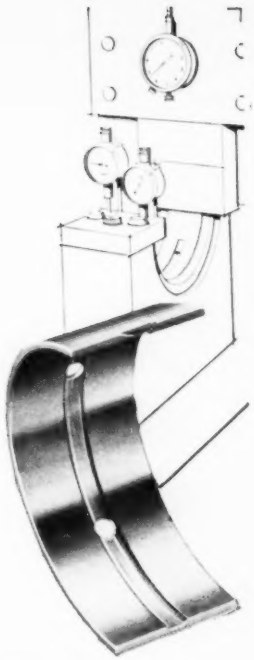
(See Market Place Section for lower contract rates).

Closing Date: If proof required, 1st of preceding month, otherwise 10th.



Specially designed hydraulic testing machine for measuring bearing strength under actual installation pressure.

We take twice the care



that's why genuine CUMMINS® PARTS give more service!

Diesel power by CUMMINS

CUMMINS Dependable DIESEL

TRADEMARK REG. U.S. PAT. OFF.

1 Genuine Cummins replacement parts are identical to the parts originally used in building Cummins Diesels. They're manufactured to the same minute tolerances and top-quality standards typical of precision aircraft engine parts. Some parts are manufactured especially for us by carefully selected suppliers. Then, Cummins technical men work almost continually, right in the suppliers' plants, to assure these parts being made exactly to our specifications. *Each part* must meet these rigid requirements before it leaves the supplier.

2 Cummins' own laboratory tests metal samples—and often every individual piece—from each shipment, to make sure that all parts meet highest metallurgical standards. And to make twice-certain, each part must pass a final quality inspection before it is offered for sale to you. It's this kind of *extra* care that insures more miles and more years of service from Genuine Cummins Parts.

CUMMINS ENGINE COMPANY, INC. · COLUMBUS, INDIANA

Export: CUMMINS DIESEL EXPORT CORPORATION • Columbus, Indiana, U.S.A. • Cable: CUMDIEX

WATSON & MEEHAN
1960 Folsom St. • San Francisco 3, California
Telephone Market 1-8930
Branch: 248 Palm Avenue, Fresno 3, Calif. *Authorized Sales & Service:* Connell Motor Truck Company, Stockton, Calif.; Frank J. Coyle, Sacramento, Calif.; Connell Motor Truck Company of Redding, Redding, Calif; Fred E. Barnett Company, Eureka, Calif.; Nevada Transit Company, Reno, Nevada.

CUMMINS SERVICE & SALES
1661 McGarry St. • Los Angeles 21, California
Telephone Prospect 1021
Branch: 401 Golden State Highway, Bakersfield, Calif. *Authorized Sales & Service:* Leo's Diesel Service, Blythe, Calif.; Smith's Diesel Sales, Colton, Calif.; Rhyne's Automotive Service, El Centro, Calif.; F. R. Laux Diesel Service, San Diego, Calif.; Newton Automotive Service, Baker, Calif.

CUMMINS DIESEL SALES OF IDAHO, INC.
1204 Front Street • Boise, Idaho • Tel. 3783

CUMMINS DIESEL SALES, INC.
South 155 Sherman Street, Box 2185
Spokane 5, Washington • Tel. Madison 0101

CUMMINS DIESEL SALES OF COLORADO, INC.
2150 Curtis Street • Denver 5, Colorado
Telephone Acoma 5933
Branch: 628½ West Yellowstone Highway, Casper, Wyo.

CUMMINS DIESEL SALES OF MONTANA, INC.
2211-13 Fourth Avenue North
Billings, Montana • Telephone 3904

CUMMINS DIESEL SALES OF WASHINGTON, INC.
2520 Airport Way • Seattle 4, Washington
Telephone Main 7160
Authorized Sales & Service: Kenny's Cummins Diesel Service, Aberdeen, Washington; Motor Service & Machine Works, Ketchikan, Alaska.

CUMMINS & MORAN (2-13)
126 West Madison Street • Phoenix, Arizona
Telephone 4-4040 and 4-2504
Branch: 1921 North Broadway, Albuquerque, New Mexico. *Authorized Sales & Service:* Cooper Tractor Service, Yuma, Arizona; Stirling Diesel Service, Las Vegas, Nevada; Willis Diesel Engine Service, El Paso, Texas.

CUMMINS DIESEL SALES OF OREGON, INC.
1225-1235 Southeast Grand Avenue
Portland 14, Oregon • Telephone East 7146
Branches: 731 Garfield Street, P. O. Box 367, Eugene, Oregon; Medford, Oregon. *Authorized Sales & Service:* Coos Bay Boat Shop, Coos Bay, Oregon.

CUMMINS INTERMOUNTAIN DIESEL SALES COMPANY
1030 Gale Street • Salt Lake City, Utah
Telephone 9-3768
Authorized Sales & Service: Wally's Chevron Truck Service, Cedar City, Utah.

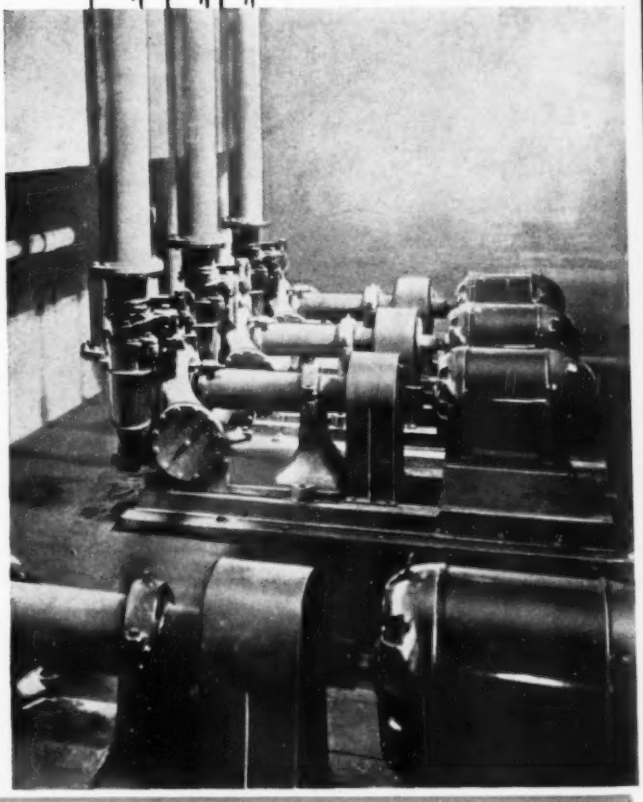
For mill pulp

Buy WILFLEY for Cost-Saving Performance

WILFLEY centrifugal PUMPS

Companion to famous WILFLEY Acid Pumps

A large Western copper mill depends on this bank of 8" WILFLEY Rubber Lined Sand Pumps for handling mill pulp on an economical basis. →



Mill pulp, sands, slimes, or slurries of any kind—all are handled efficiently and economically by famous Wilfley Sand Pumps. And now the new WILFLEY Model K Centrifugal Sand Pump offers many important mechanical improvements which give you even greater dollar savings—in power and production. This rugged, heavy-duty new pump delivers continuous, trouble-free performance, stepped-up production and dependable service. Individual engineering on every application—an economical size for every pumping requirement. Write or wire for details.

●

A. R. WILFLEY & SONS

Denver, Colorado, U.S.A.

New York Office: 1775 Broadway, New York City

BUY WILFLEY FOR COST-SAVING PERFORMANCE